THE

AMERICAN JOURNAL

OF THE MEDICAL SCIENCES.

JULY, 1899.

ANOMALOUS ERUPTIONS IN TYPHOID FEVER.[1]

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The characteristic lenticular eruption in typhoid fever has been so well studied that there is little to be added to our knowledge of it; but, irrespective of the significant rose-spots, there are rashes which are comparatively rare, imperfectly understood, and become the cause of confusion and error. The two that I shall specially examine are a diffused erythema simulating scarlet fever and an eruption like that of measles. Let me take up the scarlatiniform eruption first and illustrate it by a few cases.

Case I.—Sarah V. (No. 2647), aged fourteen years, was admitted into the Pennsylvania Hospital on February 11, 1898. She was in the seventh day of typhoid fever; the temperature was 103.2°, the Widal reaction was positive. From the first the mottled look of the skin attracted attention; the characteristic rose-colored spots of typhoid soon became unusually profuse; they were seen on the abdomen, back, chest, and even on the face. The case did not prove a severe one. A remarkable feature was the appearance on the night of the twelfth day of the disease of a bright red erythematous eruption, readily affected by pressure and very generally diffused, but especially marked on the face and back. There were blotches of more vivid hue than others; there was no itching. No rise in temperature or abnormal state of the urine was observed in connection with the rash; the highest temperature attained was only 100.2°. No sore-throat existed, and the symptoms did not become aggravated by the occurrence of the eruption, which passed away by morning. The case went on uninterruptedly to recovery.

[1] Paper presented to the Association of American Physicians at its May meeting, 1899.

A yet more striking illustration of the scarlatiniform rash, and one in which this lasted very much longer, was afforded by the next case.

Case II.—Katie F., a young woman, was admitted into the Pennsylvania Hospital on March 6, 1897, having been ill for about five days. She had been previously in good health, and had never had either measles or scarlet fever. On admission to the hospital her temperature was noted at 103°, but it soon rose to 105°; the urine showed a trace of albumin, and one finely granular cast was found. The skin was very fair, so that any spots could have been readily detected, but none were observable. The next day there appeared on the face and arms a bright red, erythematous rash, which lessened somewhat after sponging, and was not always equally distinct, seeming to come and go, though never wholly leaving. There was no rash of the kind on the body, but it was specially observed that pressure on the skin everywhere produced a red spot which only slowly faded. The temperature ranged between 103° and 104.2°. On the 9th great disturbance of respiration was perceived, the breathing fell to twelve in the minute, and was jerky and irregular, and the erythematous rash which had disappeared showed itself again on the face and arms, giving the patient the appearance of scarlet fever—an appearance which was increased by a redness of the tonsils and the pharynx, the latter being covered with tenacious mucus. She was very ill, but the temperature-range was not materially different; during the night it ranged from 103.2° to 104.6°, and she was very delirious.

On the 11th the rash was still visible, and still could be made to disappear temporarily on pressure. It was again noted that none was to be seen on the body, though it now showed itself on the back of both legs; around the elbow-joints it was much less marked than on the back of the hands and forearm. Few of the characteristic lenticular typhoid spots were discernible; there were two doubtful ones on the chest. The Widal test gave a positive reaction. The influence of cold sponging was very irregular. At one sponging the temperature fell as much as six degrees; at another, of similar length and thoroughness, but four-fifths of a degree. As the case advanced the urine contained rather more albumin, and red corpuscles and quantities of hyaline and pale granular casts were found. The patient died six day after admission into the hospital, near the end of the second week of typhoid fever, the rash being evident to the last. At the autopsy a great number of prominent and swollen solitary glands and Peyer's patches were seen, but none were ulcerated. The spleen was large and soft and weighed ten ounces. The lower surface was slightly mottled; the posterior portions of the lungs were congested; the kidneys were large, weighed seven and a half ounces; the substance was firm, the capsules adherent. The rash was not discernible on the surface of the body.

There are in this case some points for special study. First, the scarlatinal rash appearing in the first week and at a time in advance of the characteristic rose-spots. The rash was uniform, was not, as in the first case, preceded by mottling, was easily influenced by pressure, did not apparently modify the temperature, and persisted to the last. In

its early appearance it was like a case described by Murchison,[1] in which a delicate scarlet rash all over the body preceded for two or three days the lenticular spots of enteric fever. The scarlatiniform rash may remain through the fever, though it rarely does so. Irrespective of its appearance in the first week, it may come on late in the disease, and I have known it to manifest itself even in convalescence (case of Thomas G., Pennsylvania Hospital, December, 1880) and to return in a relapse. Its character may be thus described: It is a uniform red rash, like scarlatina; it is seen all over the body, though not so in every instance. It is more distinct in some places than in others. It is easily influenced by pressure. It has its periods of greater or less intensity, of partial disappearance, of vivid return. It lasts generally a week or somewhat longer. It passes away without desquamation—at least I have never seen this happen. It does not perceptibly influence the course of the temperature. It is for the most part unconnected with sore-throat or with albuminuria. As regards albuminuria, I have observed this in some of the cases I met with, but it was a prior condition connected with the typhoid fever. With reference to sore-throat, this was in a mild form in Case II., and Jenner mentions an instance in which slight sore-throat was an accompaniment, and typhoid fever was mistaken for scarlet fever. Save under the exceptional circumstances of attending sore-throat and desquamation, there is no difficulty in determining the two diseases, or in diagnosticating that scarlet fever is not intercurrent in typhoid.

Rarer than the scarlatiniform eruption, and much more misleading, is an eruption like measles. This case may serve as an illustration:

Case III.—Richard G., aged twenty-eight years, was admitted on November 26, 1886, into the Pennslyvania Hospital on the eighth day of typhoid fever. The face was flushed, the temperature 103.4°; there was marked hebetude. The abdomen was tympanitic and its surface covered with a coarse, slightly papular eruption, not crescentically arranged and not disappearing on pressure; besides, there were a few rose-colored spots. In the course of the fever the eruption faded slowly and imperfectly, and was still perceptible when convalescence was reached. It retained its coarse appearance, and never showed itself on the limbs or thorax or the face. The notes speak of its similarity to the rash of typhus. There were also numerous sudamina. The temperature at one time reached 105°. The urine was free from albumin, though once a trace of albumin and a few hyaline casts were observed.

In this case the measly eruption was limited in its extent. It was much more diffused in the next case, which, moreover, afforded a good opportunity of studying the question of its association with any temperature changes.

[1] Case XLV., Treatise on Continued Fevers.

CASE IV.—John McG., a soldier, aged nineteen years, was sent to the Pennsylvania Hospital on November 15, 1898, suffering with typhoid fever. He had been ill for two weeks, and there were many rose-spots on the chest and abdomen. The temperature was 104.6°, the face very flushed, the spleen much enlarged; the urine contained albumin as well as a few hyaline casts; the Widal test gave a positive reaction. Five days after admission an eruption closely resembling measles appeared on the chest, abdomen, back, and upper part of the thigh, and later, though much more sparsely, on the legs, and yet more sparsely on the arms. On the face there were not many; they showed themselves late, and were less distinctly measly in appearance; in the notes they are described as blotches. Nowhere was there a crescentic arrangement of the raised red spots, which, however, in many places coalesced, and did not disappear on pressure. They passed away in five days, without itching or desquamation, the blotches on the face first, those on the legs last. The eyes were slightly injected, but no catarrhal symptoms existed. There were many places on the chest and abdomen in which the rose-colored typhoid spots were perceptible near the measly rash. Much hebetude was observed while the rash lasted, but, as hebetude had been noticed from the time the patient was first seen, it could not be associated with the occurrence of the rash.

The appearance of the rash was not combined with any marked temperature changes. On the 18th the temperature ranged around 103°. On the 19th, the day preceding the eruption, the temperaure at 9.20 A.M. was 101.6°. It rose during the day to 103°, modified, however, by sponging. During the night it continued to rise, until by 9.30 A.M. of the 20th, the day the measly eruption appeared, it reached 103.8°. On that day the temperature slowly fell, except for occasional rises, whch were kept in check by sponging, until by 8 P.M. it had declined to 102.6°. During the night it continued to fall, the rises still being kept in check by sponging, until by 9.10 A.M. on the morning of the 21st it had reached 101°. During the 21st it went up slowly, passing to near 102° by 9.30 P.M., and continued to rise during the night until, by the 22d at 9.20 A.M., it had passed to 102.6°. During the 22d the line was gradually downward, with the exception of one decided rise at 4.10 P.M., when it reached 103.8°, this rise being promptly influenced by sponging. On the 23d the range of temperature was, on the whole, lower than on the 22d, the highest attained being 101.6° at 7.40 P.M., and the lowest reached being 100°. On the 24th the temperature again went up, and on one occasion, at 1.40 P.M., for a short time reached 103·6°. During the night it steadily fell, and on the 25th, the day of the disappearance of the eruption, it was 98.6° in the morning, though once in the day it reached 101.8°. These details of temperature are given that we may ascertain if the eruption exercised any influence on it. On the whole, the temperature showed only the zigzag which is common at this stage of typhoid fever, and did not appear to be influenced by the eruption. If any other inference were drawn it would be that the temperature was somewhat higher in the twenty-four hours preceding the eruption, and fell slowly on the day of its occurrence. The patient soon entered upon steady improvement, and was entirely convalescent sixteen days after the disappearance of the eruption.

The similarity of these cases of typhoid fever with measly eruption to typhus fever is very great, and, when we have cases in which the

nervous symptoms are pronounced and enteric symptoms absent, it is very difficult to come to a conclusion, unless the malady has been seen from the beginning and the temperature has been studied from the beginning; for the measly rash common in typhus fever and very uncommon in typhoid has in both much the same appearance. How much alike typhoid with measly rash may be to typhus is proved by the following case:

CASE V.—John O'R. (No. 2457), aged eighteen years, previously in excellent health, living in good surroundings and not known to have been exposed to any disease, was admitted on December 12, 1898, into the Pennsylvania Hospital with a fever of a low type, stated to be of eight days' duration and to have begun with epistaxis and vomiting. His face was flushed, he was delirious, the tongue was dry and brown, the pulse weak, the temperature 103.6°, the spleen large; albumin and granular and hyaline casts were found in the urine; rose-spots were seen on the abdomen; the Widal test was positive. He presented altogether the picture of a case of typhoid fever with marked prostration and cerebral symptoms. The delirium was the most striking feature, and in it he got out of bed and attempted to throw himself out of the window, but was fortunately caught. Two days after admission, and on the tenth day of the disease, he was covered from head to foot with a profuse eruption. On the face, hands, and feet it was as evident as on the rest of the body, and, though influenced, it did not disappear on pressure. It was composed of numerous spots of irregular form, very slightly elevated above the skin, and precisely like the measly eruption often seen in typhus. The similarity to this disease became now greater and greater, and was heightened by the absence of enteric symptoms and the occurrence on the left side of a true pneumonia of the base with rusty sputum—a form of pneumonia much more common in typhus than in typhoid. The eruption was so thick over the body that there was scarcely a pin-point free. It was not crescentically arranged; here and there it was petechial. Fearing that the case might, after all, be typhus, the patient was carefully isolated and then removed from the hospital, as a sorrowful experience of having had cases admitted into the Pennsylvania Hospital, some years ago, that proved to be typhus[1] and resulted in our having within its walls very many serious instances of the disease before we got rid of it, determined me to let the rest of the patients and the attendants run no risk. The similarity of typhus remained great to the end. The temperature, the day after he left the hospital, fell by crisis, as it often does in typhus fever; the eruption showed merely as brownish traces. Another Widal examination gave positive results, and the patient slowly recovered.

Looking back over the history, though the case is still not free from doubt, I believe it to have been one of typhoid fever, rendered uncertain chiefly on account of the peculiar measly eruption here under consideration.

Another error likely to arise is due to the occasional occurrence of

[1] "Researches on Typhus Fever." AMERICAN JOURNAL OF THE MEDICAL SCIENCES, January, 1866.

true measles in typhoid fever. This intercurrence may be studied in the two cases now to be detailed.

CASE VI.—Gerano L., an Italian, aged seventeen years, was ill with typhoid fever for a week when admitted into the Pennslyvania Hospital on January 17, 1898. Diarrhœa and tympany were absent, but the typhoid eruption on the chest and abdomen showed very clearly through his dusky skin. By the 26th of the month the morning temperature was 99°, but it rose in the evening to 102° and slightly beyond. On the 27th and 28th there were the same morning remissions and evening exacerbations to between 102° and 103°. On the 29th, the morning temperature being 99.6°, the conjunctiva was noticed to be injected, photophobia was complained of, there was some cough, and an eruption of measles showed itself. The temperature rose to 102.1°, and went on rising as the eruption spread over the body, until on the 30th it reached 105°. On the 31st it dropped to 102° and the catarrhal symptoms persisted. On February 1st the temperature became normal; the rash was fading. The boy was then transferred to the children's ward, which at that time contained a great many cases of measles, and where he convalesced.

CASE VII.—Paul B., a soldier, aged twenty-one years, admitted to the Pennsylvania Hospital on September 20, 1898, with typhoid fever. By the 26th his temperature had touched normal, he was sitting up in bed, and hungry. On the 29th the thermometer marked the normal, or, at the highest, 99°. He was noticed to have coryza, injected eyes, headache, and cough. Soon the temperature began to rise, and on October 5th it was at 101°, and an eruption of measles appeared on the face. The next day the whole body was covered with measles. On the trunk the crescentic arrangement was noticeable; severe itching was complained of. It was ascertained from the patient by Dr. James C. Wilson, under whose care he then was, that he had never had measles, but had been exposed to it thirteen days before the catarrhal symptoms appeared, while riding to the hospital train in an ambulance with a case of measles. The Widal test, made while the measles existed, was negative, but there was a positive diazo reaction. The urine showed uric acid crystals, but neither albumin nor sugar. The temperature on the second day of the eruption fell to 99°, and subsequently was subnormal. Desquamation was noted on the fifth day. The recovery was a good one, except for a double phlegmasia dolens which protracted it.

When we contrast these cases of coexisting measles and typhoid fever with cases of typhoid fever in which a measly rash happens, we find striking differences. First, in the character of the eruption. This in true measles is coarser, more markedly papular, and has the well-known crescentic arrangement, which is not seen in typhoid fever. Secondly, there is itching and there is desquamation, which are also not observed in the typhoid fever rash. Moreover, the presence of the coryza and catarrhal symptoms is very significant in the intercurrent measles. But of greatest value and meaning is the temperature record. In the measly eruption of typhoid the eruption has no marked influence on the temperature, or greater variations are not met with than belong to

the stage of the typhoid fever in which the measly eruption may occur. It is different, as is seen by studying the temperature in both of the cases just described, in intercurrent measles. The temperature here rises decidedly in the days immediately preceding the eruption, in the prodromal stage, exactly as in ordinary measles, and it goes on rising, or remains high, with the spreading eruption. This is quite unlike what happens in the measly eruption in typhoid fever. Where we are nearing convalescence, and the temperature has been ranging around the normal line, these temperature changes are of the greatest value in diagnosis. They are necessarily less so earlier and while the fever temperature of the enteric fever itself is still a pronounced one.

We have thus described a scarlatiniform eruption, a morbilliform eruption, and also spoken of the mottling of the skin. This mottling, as in typhus, is due to a subcuticular rash, and may remain as the only eruption, or precede or attend either of the other kinds. The interesting question now arises, Are all these really separate forms, or merely different expressions of the same pathological condition—in reality one affection? I believe they are one, for I have seen them combined in the same patient and apparently interchangeable. Here is a case in proof:

Case VIII.—Walter R. (No. 1684), a soldier, aged twenty-two years, brought from Camp Meade, was admitted into the Pennsylvania Hospital on September 20, 1898, with typhoid fever. When a child he had measles and scarlet fever. He has also had pneumonia and a previous attack of typhoid fever. The day of admission, and as nearly as could be ascertained the seventh of the disease, the patient had a temperature going from 103.6° to 104.8°; there had been epistaxis; the bowels were very loose. The next day one or two lenticular rose-spots were observed on the abdomen, but what particularly attracted attention was a strange general mottling of the skin, especially marked on the chest, abdomen, and thighs. By the 24th the mottling was nearly gone; a few new rose-spots were observed on the left side of the abdomen. The temperature, that had been ranging between 102.5° and 104.4°, was somewhat lower —between 102° and 103.6°. On the 27th, though the mottling could still be seen, it was very indistinct, but many rose-colored typhoid spots were perceptible. On the 28th, the fifteenth day of the disease, a curious coarse, granular eruption like measles, but not crescentically arranged, and affected by, but not disappearing on pressure, showed itself on the shoulders and upper part of the arms. It was not associated with any rise of temperature: on the contrary, before its appearance the morning temperature marked only 99°, the lowest it had attained at all, and during the evening it rose to 104°, about the same that it had been the two previous evenings. The tongue was dry and cracked; there were no bronchial symptoms. The next day the measly rash still persisted; it was evident on the shoulders and upper part of the arm, and there was in addition most marked redness of the neck and lower part of the arms, of the hands, and of the chest, closely resembling scarlet fever. Neither coryza nor sore-throat was present. The scarlet fever

redness left white traces when the fingers were rapidly drawn across the skin, but the hyperæmia returned. There was no redness of the face. The urine was acid, and contained no sugar, no albumin, or casts. The Widal test gave a positive reaction. Four days after the appearance of the measly rash it had gone entirely, and the scarlet fever redness was only visible on the neck, and even there had faded. The general mottling of the whole body remained. On the afternoon of the same day the temperature, without any apparent cause, went up from 101° to 103°, and the erythematous, scarlatiniform rash at once returned on the neck, chest, and wrists. There was no recurrence of the measly rash; the flush of the skin vanished in forty-eight hours, and came back no more. Lenticular typhoid spots remained. The patient now entered upon convalescence.

The pathological condition is, I think, a hyperæmia of the skin, with here and there in the measly form an exudation in its layers, most likely a swelling and thickening of the corium and rete Malpighii, much as it exists in measles; but I can merely surmise this, as I have no anatomical observations to offer. It is not easy to determine how these eruptions are produced, and, while several views suggest themselves, no definite proof can be given of their absolute correctness. That the rashes are not caused by the administration of any remedy, which, like quinine or iodide of potassium, gives rise to cutaneous eruptions—a dermatitis medicamentosa—is certain, for they may be encountered, no matter what the treatment employed. The bath treatment is not responsible for them. It was not used systematically in any of the cases detailed in this paper, though in some with high temperature the bath was at times resorted to. The anomalous rashes may be the result of the irritation of the skin from the bacilli in the infected blood; but I believe rather that they are the expression of disorder of the cutaneous nerves, that they are due to the vasomotor disturbance; but how this is caused is very doubtful. It, too, may be from direct bacillar irritation, though rapid changes in the eruption, its appearance, often sudden, and disappearance, equally sudden, are against this view. More likely is it from the blood infection, but whether this be due to the toxins from the bacilli or the absorption of the broken-down material in the diseased intestine, must be a mere surmise. Yet we have a strong analogy in the production of ordinary urticaria, which we constantly see arising from the absorption of products of certain articles of food that are not readily digested, but which is also met with from purely nervous causes, as from mental excitement or sudden emotion; and it is a remarkable fact that urticaria, too, sometimes happens in typhoid fever. I have myself never seen any instances, but they have been described by Griesinger, and Dr. Woodbury has recently called my attention to a case that occurred in his practice.

The nervous element and the vasomotor disturbance are certainly

very strong factors in the production of these typhoid fever rashes. Lemaigre,[1] who does not believe that they are always due to the same cause, cites a case of Siredey's, in which a man went on having scarlatiniform eruptions for years afterward. The first of these rashes happened in typhoid fever, and was even followed by desquamation. He recovered entirely, but had nine subsequent attacks in the succeeding years, each also followed by desquamation.

The nervous element showed very strongly in this case, which was under my care at the Pennsylvania Hospital:

CASE IX.—T. G., aged twenty-five years, a man of excellent physique and good habits, was in the Pennsylvania Hospital with typhoid fever in September, 1880. During its course marked flushing of the face was noticed, and he stated in explanation that he always flushed readily and from the slightest cause. There were successive crops of rose-spots, even on the arms. During convalescence he had an attack of general erythema, looking like a scarlet-fever eruption, but unconnected with sore-throat. He was discharged from the hospital November 22d, and returned in December with severe pain in the back and the sciatic nerve on the right side, said to have followed sleeping in a cold, damp place. It was attended with moderate fever, which lasted for nearly two weeks, and concerning which it was doubtful whether it was a typhoid fever relapse or not. It was not accompanied by rose-spots or enteric symptoms or albuminuria, but as it kept up without apparent cause it was looked upon as a typhoid-fever relapse. In its course it was observed that whenever he was spoken to in a decided manner there was flushing of the whole surface; indeed, the arms and face especially flushed under the least excitement. The flushing in the face was attended with a sense of heat, but this was not the case in the rest of the body. After keeping quiet for a few minutes the erythema always subsided, leaving a mottled appearance of the surface. There was no sore-throat, and no desquamation ever followed the erythematous flushings, but engorgement of the capillaries gave to his skin the appearance of scarlet fever. It was, however, only in parts uniform; in others in uneven patches, and it was not attended with any feeling of cold or with itching. There was never any evidence of rheumatic affection of the joints, muscles, or heart. The temperature, which ranged about 101°, did not become normal until eighteen days after his readmission into the hospital, and he was soon afterward discharged.

There is nothing in these rashes which seems to add gravity to the prognosis. It is true—though there are instances in this paper which show the contrary—that they mostly happen in severe cases of typhoid fever; especially does the morbilliform eruption, which is much more apt to occur later in the disease and to be associated with graver symptoms than the scarlatiniform rash. But the prognosis is to be determined by these symptoms rather than by the eruptions; and, as regards treatment, they call for no special line of therapeutics. As febrile albu-

[1] Thèse de Paris, 1888, No. 209.

minuria may coexist we must pay close attention to the renal secretions. It is from the point of view of diagnosis and pathology that these rashes merit attention and serious study.

SOME REMARKS ON TYPHOID FEVER AMONG OUR SOLDIERS DURING THE LATE WAR WITH SPAIN.

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In August, 1898, Surgeon-General Sternberg appointed a board consisting of Major Walter Reed, U. S. A., Major E. O. Shakespeare, U. S. V., and the writer to study the causes and the spread of typhoid fever among the troops in the various camps within the United States. In accordance with this order the members of the board have been and are still engaged in this investigation. Although our work is as yet incomplete, and our conclusions may be somewhat modified after we have collected and compared more figures, we are apparently justified at present in formulating certain conclusions which may be of some interest to the profession. With the approval of the Surgeon-General and of my colleagues on the board I am permitted to present to you some of the facts that we have learned, with conclusions, which, in our opinion, are justified by these facts.

It may be well, in the first place, to say something concerning the methods which we have pursued in our investigation of this subject. In accordance with the instructions given us by the Surgeon-General we visited and carefully inspected all the larger encampments in the United States, including Camp Alger, the camps at or near Fernandina, Fla.; Jacksonville, Fla.; Huntsville, Ala.; Chickamauga Park, Ga.; Knoxville, Tenn.; Wycoff, N. Y., and Meade, Pa. In making this inspection, to which we gave about six weeks of time, we endeavored to ascertain by direct personal observation the conditions under which the soldiers lived. We visited nearly every regiment at each of these camps, made ourselves acquainted with the water-supply, the quality and quantity of the food, the preparation of the food, the nature of the soil of the camp, the space alloted to regiments, the arrangement and size of the tents and the number of men occupying each tent, the location of sinks with reference to the mess tents, the disposition of fecal matter and garbage, the thoroughness with which the camps were policed, etc. We visited regimental, division, and other hospitals, and ascertained the methods of disinfection practised in these hospitals. In short, we endeavored to see for ourselves everything that might have a bearing on the origin and spread of typhoid fever. While making this inspec-

tion we took the testimony of medical and other officers. We hoped to be able to interview at least one medical officer in each regiment, but this was not always possible. However, the information that we obtained in this tour of inspection was considerable and some of it of much value.

Since finishing the inspection we have been engaged in studying the records in the office of the Surgeon-General. In this study also we have regarded the regiment as the unit; following, however, the details of the course of the epidemic in each company constituting the command. We have endeavored to ascertain when typhoid fever first appeared in each regiment and how it afterward spread. How many cases there were in each company; if one or more companies furnished an unusually large number of cases; we have endeavored to ascertain whether or not the men in these companies have lived under unusual conditions. Thanks to the courtesy and intelligence of some of the regimental medical officers, we know how many men in each tent had typhoid fever and the initial date of each case. In our complete report we hope to give all these data, but in this paper I must content myself with general statements, substantiated by a few details.

We had not finished our first day's work at Camp Alger before we saw that one factor in the problem must be thoroughly dealt with before we could hope to reach a satisfactory solution. Fortunately we promptly took steps to acquaint ourselves with this factor. It cannot be denied that scientific medicine would have gained much had this factor been provided for at an earlier date. I refer to the question of the scientific diagnosis of typhoid fever. In the division hospital at Camp Alger we found most of the febrile cases diagnosed as malarial. We believed that they were typhoid fever, but the surgeons in charge had diagnosed them malaria. We requested that competent men, properly equipped for making blood examinations for the malarial plasmodium and the Widal test, should be sent to each of the larger camps. The Surgeon-General acted promptly on this suggestion. Drs. Gray and Carroll, of the Army Medical Museum, went to Camp Alger for this purpose. Subsequently Dr. Carroll continued this work at Jacksonville. Dr. Dock, of the University of Michigan, made investigations at Chickamauga, Knoxville, and Meade. Acting Assistant Surgeon Craig also spent several weeks in making blood examinations at Sternberg Hospital, Chickamauga Park. Dr. Curry, acting assistant surgeon at Fort Meyer, has made many hundreds of blood examinations upon sick soldiers sent from Camp Alger, Jacksonville, and other camps. As a result of the work done by these men we are able to state that malaria was a very rare disease among those troops who remained in the United States. Among the hundreds of blood examinations made on soldiers from Camp Alger the plasmodium was not found among the troops at

this place. Dr. Dock found one case at Chickamauga and one at Meade. The one at Chickamauga was a private of the Second Arkansas Volunteer Infantry, who stated that he had had chills and fever at home in the spring of 1898 before he enlisted. The malarial case at Camp Meade belonged to one of the Pennsylvania regiments. Two weeks before the examination of the blood this man came, so he stated, from a camp on the banks of the Potomac. It will be seen, therefore, that in each of these cases the plasmodium was probably introduced into the system elsewhere than at one of the large camps.

Malaria was probably more frequent than these figures indicate, but that the long continued fevers diagnosed as malaria in nearly all the field hospitals were typhoid fever, there can be no doubt. The sick reports contain evidence in themselves that malaria was not a prevalent disease among the troops. The 158th Indiana, Sixth Ohio, and First West Virginia constituted at Chickamauga Park one brigade, and were encamped side by side. From the sick reports it appears that malaria prevailed in the Indiana regiment from May throughout the summer. There were no cases in the Ohio regiment in May, three in June, eleven in July, 103 in August, and 203 in September. In the West Virginia regiment malaria does not appear on the records until August, when 108 cases are reported. That there should have been malaria in the Indiana regiment in May and not a case in either of the other regiments in the same brigade, is not probable; and that it would have taken this disease two months, had Chickamauga been the fearfully malarious place it is said by some to be, progressing slowly through the Ohio regiment to reach the West Virginia regiment, is not in accord with any known epidemiological facts concerning this disease. Pushing our inquiry further, we find that in the Ohio regiment 273 individuals are recorded as having had malaria. Sixty-six of these were sick only a few days. Among those there may have been a few cases of malaria, but the probabilities are that even for these a diagnosis of febricula would have been quite as scientific. Of the 207 cases of protracted malaria, 148 were still sick when the last report consulted by us was made (October 31, 1898). This leaves fifty-nine cases of completed malaria, among which there are quoted twelve deaths. A death-rate of more than 20 per cent. in "mild, remittent malaria," as the disease is designated by one of the surgeons, is, to say the least, unexpectedly high.

To summarize concerning the so-called protracted malarias reported by the regimental surgeons, we will say that, in our opinion, practically all of these were typhoid fever, and the following are our reasons for this opinion:

1. The uneven distribution of the so-called malaria among regiments encamped side by side gives us cause to suspect that these were not malaria.

2. Some of the surgeons who failed to record their cases as typhoid state in their comments that typhoid fever prevailed in the regiment. One illustration of this may be of interest. From April to November there were in the Sixth Ohio, according to the recorded diagnoses in the monthly reports, only two cases of typhoid fever. Notwithstanding this fact, the acting assistant surgeon in charge at that time writes in the October report the following statement: "The health of the command is improving. The prevailing disease that has caused the sickness we have had is typhoid fever." And yet the September report showed only one cases of typhoid fever, and the October report showed only one case, and this one case was one and the same patient carried from the August report on to the reports for September and October.

3. The results of several hundred blood examinations show that malaria was a very rare disease among the troops that remained in the United States.

4. Malaria as it exists in this country is easily controlled by moderate doses of quinine. All the so-called protracted malarias in our camps were treated with large doses of quinine and were not improved thereby. Consequently, we must conclude that the diagnosis given these cases was erroneous.

5. The mortality of the so-called protracted malarias corresponds with the mortality of typhoid fever, and furnishes most positive proof that these cases were not malarial.

When we began to study the regimental sick reports we found that, in order to obtain satisfactory information, we must endeavor to ascertain how many cases of typhoid fever there were in each regiment, and it soon became evident that the regimental sick reports did not give this information. Of two regiments in the same brigade, one had more than 200 cases of recognized typhoid fever, as shown by the regimental reports, while the other regiment on like evidence had only two cases, but the records of the second regiment show more than 200 cases of protracted malaria, and these furnished a mortality as high as that of the typhoid fever in the first regiment. For the reasons already given, we have included all the protracted malarias among our list of the typhoids. It may be asked how long we have considered it necessary for a so-called malaria to run in order to make it a probable typhoid. In answer to this I will state that we have regarded all so-called malarias of ten days or more in duration as possible cases of typhoid fever. We think that the great rarity of true malaria and the readiness with which these rare cases have yielded to quinine, and the fact that quinine was so generally administered, justify us in this conclusion. Practically, however, the number of doubtful cases is exceedingly small.

Typhoid fever was not only diagnosed malaria, but it was covered up by many other names. In one regiment the death-rate from pro-

longed indigestion amounted to 15 per cent. of the completed cases. In another regiment at Chickamauga dengue is a frequent diagnosis of many cases which undoubtedly were typhoid fever. That dengue should have prevailed in one regiment only among the 60,000 troops at Chickamauga is too absurd to receive serious attention. By tracing all doubtful cases to the hospitals we have been able to reach a positive opinion concerning the nature of most of them. In some regiments we have made an alphabetical list of all the sick. In others we have taken only those who are recorded as having had some intestinal disorder, malaria, or some form of continued fever. In some regiments many cases were diagnosticated simply continued fever. In others the surgeons seemed to regard enteric fever as distinct from typhoid fever. The belief of some of the medical men in "typho-malaria" is evident by their reports.

The origin of typhoid fever in all the larger encampments is easily determined. Many of the volunteer regiments and some of the regular regiments were infected with typhoid fever before they reached the national camps. A few illustrations may be interesting. The Sixth Ohio reached Chickamauga Park on May 18th with a case of recognized typhoid fever. This patient was kept in the regimental hospital until he died, May 24th. The Ninth New York arrived at Chickamauga May 25th. There was a suspiciously prolonged case of diarrhœa on June 10th, and one of enteric fever three days later. The Thirty-first Michigan arrived May 17th, and furnished a recognized case of typhoid fever June 1st. The First Arkansas reached Chickamauga May 27th, and sent a probable typhoid case to the division hospital June 2d, and a recognized case of typhoid fever June 3d. The Fifty-second Iowa came May 31st, and the surgeon recognized a case of typhoid fever June 8th. The First Missouri went into camp at Chickamauga May 21st, and had a suspicious case May 31st. The Fifth Missouri came May 27th, and furnished a suspected case June 6th. The Second Kentucky arrived May 26th, and, so far as the records show, had no typhoid fever until June 26. The Second Missouri arrived May 20th, and furnished a probable case May 26th. The Twelfth New York came May 20th, and the first suspected case had its initial date ten days later. The First New Hampshire arrived May 22d, and two days later entered on its sick report a case that was most probably typhoid fever. The Eighth New York arrived May 25th, and did not show any evidence of the existence of typhoid fever until June 24th. However, as this patient died July 1st, it is probable that the true initial date was earlier than is indicated. The Second Ohio arrived May 18th, and two days later a case diagnosed as "gastro-enteritis," and which may have been typhoid fever, was treated in the regimental hospital. These are not selected regiments, but these data were taken from a bundle of records at hand at the time

of this writing, and each record in the bundle was examined. It is safe to say that more than 90 per cent. of the volunteer regiments that went to Chickamauga Park reached that place infected with typhoid fever. So wide-spread is typhoid fever in this country that in assembling a regiment of volunteers the probabilities are that one or more men in the regiment will be found to be infected with this disease at the time of enlistment. Medical officers might do well to bear this in mind and be on their guard for the detection of the first case of typhoid fever. Instead of doing this, many medical officers will refuse to recognize typhoid fever until it assumes epidemic proportions, and the records that we have studied show us that often when typhoid fever has become an epidemic some medical officers still refuse to give the disease its right name and prefer to call it something else. This aversion to calling typhoid fever by its right name seems to exist among medical officers in all armies. The German medical officer often calls the disease "gastric fever," and this term appears now and then in our records when the surgeon happens to be a German. The French call it "manœuvre fever." I am inclined to the opinion that medical officers often are led to suppress the diagnosis of typhoid fever for fear of the alarm that it will give the patient and others. This, however, is a mistake. We will not eradicate this disease from our camps unless we early recognize its presence and take proper steps to prevent its spread. Typhoid fever in a camp should be reported to medical headquarters and to the medical officers of other regiments as diphtheria in a school should be reported.

It may be well to emphasize the fact that our troops frequently carried in their own persons the typhoid infection to the national encampment. Some acquired the disease at the State encampments and others brought it directly from their homes. In one of the Alabama regiments typhoid fever was at first confined to one company, and this company came from a town where there was an epidemic of the disease at the time when the men enlisted. From this company the disease spread through the regiment.

The next question, How did typhoid fever spread among the troops? In answering this inquiry we quite naturally first direct our attention to the drinking water. So far as our studies have been carried up to the present time, the evidence concerning water infection in the camps visited is, for the most part, negative. There is no evidence that the general water supply at the larger encampments was infected with typhoid fever. At Jacksonville the general water supply to all the regiments was from artesian wells a thousand feet deep, and infection of this water seems well-nigh impossible. Moreover, in round numbers there were at Jacksonville last August and September 30,000 soldiers and about the same number of residents. Both soldiers

and citizens used the same drinking water, and yet there was a widespread epidemic of typhoid fever among the soldiers and only a few sporadic cases among the citizens. At Knoxville the soldiers and citizens used drinking water from the same source, and at the time of our inspection, September, 1898, there were hundreds of cases of typhoid fever among the soldiers, and the records of the health officer of the city showed no evidence of the existence of the disease among the citizens. Some of the regiments at Chickamauga drank water from the creek, which might have been contaminated. These regiments suffered from typhoid fever, but other regiments which had no water from Chickamauga Creek and which brought their supply a long distance from mountain springs, the contamination of which is highly improbable, had typhoid fever just as badly as did those who drank water from Chickamauga Creek. There is another very interesting point in this connection. The three regiments of a brigade are encamped side by side; water from the same pipes is distributed alike to all these regiments; and yet typhoid fever has prevailed for twenty days and has become an epidemic in one of these regiments, while one of the others remains wholly free from the disease. A similar condition is observed when we study the distribution of the disease among the companies in a regiment. I think that we have found evidence of water infection at some of the minor camps, and it is probable that soldiers while off duty and out of camp drank from infected wells, but we are quite confident that the general water supply of the larger camps was not infected, and that water infection played a very subordinate rôle in the spread of typhoid fever among the soldiers in the camps in this country.

All know that the specific bacterium of typhoid fever is eliminated from the bodies of those sick with this disease in the urine and feces, especially in the latter, and that the disease is transmitted from one person to another by the transference of some part of the feces from the sick to the alimentary canal of the well. It follows that the spread of typhoid fever will depend upon the disposition of the excretions of those infected. On this point we have some interesting information. The first division of the Seventh Army Corps had during its stay at Jacksonville water carriage for its fecal matter. Each company was supplied with a galvanized iron trough, the lower end of which was connected with the sewer. The connection between the trough and sewer was closed by a cylindrical plug, which could be raised whenever it was desired to discharge the contents of the trough. The other end of the trough was connected with the water hydrant. The trough was partially filled with water, and in this condition received the excrement. The contents of the trough were discharged at will.

The second division of the same army corps was furnished with tubs

or half-barrels. The fecal matter and urine were received in this without the addition of lime, dirt, or anything else. When these tubs were filled they were carted away by scavengers, emptied, cleaned, and returned. The fecal matter in the tubs was always exposed to flies, the contents were often spilled about the camp and slopped out along the road.

The third division disposed of its fecal matter in pits, as is ordinarly done in camps. Orders were issued that the contents of the pits should be covered once, twice, or three times a day, differing in the different regiments. In some regiments attempts were made to compel each individual to cover his stool as soon as deposited.

It will thus be seen that in the three divisions there were three distinct methods of disposing of fecal matter. The men in these divisions were supplied with the same water, the same rations, lived in the same kind of tents, in the same climate, and, in fact, the only difference was in the method of disposing of the fecal matter. In August and September there were more cases of typhoid fever in one regiment of the second division than in all the six regiments then constituting the first division, while the third division furnished an intermediate number. It will thus be seen that when the feces were swept out of camp with a minimum possibility of camp contamination, typhoid fever was less prevalent.

The most potent factor in the spread of typhoid fever at most of the camps was camp pollution with infected fecal matter. This was true at both the large and small encampments. It was equally true of the smaller State camps, usually of one regiment, in the Northern States, and the large national encampments of one or more corps in the South. The Fifteenth Minnesota at St. Paul and Fort Snelling, the Thirty-fifth Michigan at Island Lake, and the 203d New York at Camp Black became quite as badly infected as did any of the regiments at Chickamauga, Jacksonville, or Camp Alger. The epidemic of typhoid fever was not due to sending Northern men to Southern camps; nor was it due to the massing of many regiments together, but it was due to camp pollution. In most of the camps fecal matter was deposited in pits. Flies swarmed over the infected fecal matter and then walked over the food at the mess-tents. In many of the regimental camps fecal matter was deposited about the camp on the ground. There were pieces of woodland at Chickamauga Park through which one could not walk without soiling his shoes with fecal matter. In some of the regimental camps at Tampa the sinks were overflowed by the rains, and fecal matter floated through the companies' streets. In many regiments paper soiled with fecal matter was blown about the camp. In a few instances it happened that, when a regiment was compelled to occupy a site vacated by another regiment, in digging the sinks for the newly

arrived command the men found themselves in the filled sinks of the regiment that first occupied the ground. In at least one company, a New York regiment, a small cesspool was dug in front of each tent, and this received the wash-water and probably at night the urine. In one of the Pennsylvania regiments the men of one company dug a shallow well for drinking water in a location where the water was in all probability contaminated, and this company had an unusually large number of cases of typhoid fever. At Chickamauga a soldier was found attempting to run the guard by getting into one of the barrels on the wagon on its way to the spring to bring drinking water for the regiment. We walked through the regimental camp to which this soldier belonged, and we can testify to the fact that, although we picked our way, the soles of our shoes were soiled with fecal matter before we finished the round of inspection. In this way men carried fecal matter into their tents; and clothing, blankets, and tentage undoubtedly became infected in many instances. These are some of the ways in which the infection of typhoid fever was spread.

We have considered the question of milk-supply in all the camps visited, and can state that there is no evidence that milk was a general or frequent vehicle for the distribution of typhoid fever.

We are convinced from our observations that, when water carriage for the disposition of fecal matter cannot be secured, the complete sterilization of all fecal matter is necessary to prevent the spread of typhoid fever in camps occupied for three weeks or longer. For this purpose we have recommended that each company be furnished with a specially constructed galvanized iron trough. This trough is to be partially filled with a saturated solution of milk of lime, and is to be emptied daily by means of an odorless excavator. In large camps one odorless excavator will serve a brigade, and the cost of each trough will not be more than $15.

It must be evident to all by this time that the prevention of disease is the most important duty of army medical officers. We think that it is cheaper and no less humane to prevent sickness than it is to care for the sick. Moreover, prevention of sickness conserves the fighting force, keeps the men in good spirits, renders good discipline more easy, prevents that demoralization that comes with every epidemic, and in every way renders an army more efficient. The success of many a campaign depends as much upon the hygienic measures enforced as it does upon the military skill of the line officers. The medical officer needs special training in military hygiene, and should be selected with more care than has been exercised in the past. He should be given more authority, and then more should be expected of him.

To what extent did typhoid fever prevail among the troops encamped in this country during the summer of 1898? Owing to the aversion

shown by medical officers to diagnosing this disease correctly, as has already been mentioned, it is difficult to answer this question exactly.

The following figures show the extent to which typhoid fever prevailed among twelve regiments belonging to the First and Third Army Corps:

Name.	Time.	No. of recognized cases.	No. of probable cases.	No. of deaths among completed cases.	Total deaths.
12th New York . . .	May to November	157	490	10	17
1st Arkansas . . .	May to September 15	81	228	13	22
8th New York . . .	May to September 9	190	425	16	21
2d Missouri	May to November	180	268	17	13
2d Ohio	May to October	184	403	14	14
1st New Hampshire .	May to September 12	211	297	7	29
52d Iowa	May to September	175	345	20	35
1st Missouri	May to September 8	45	216	5	17
5th Missouri	May to October	47	212	8	16
31st Michigan . . .	May to October	84	239	7	9
2d Kentucky . . .	May to September 15	89	286	14	27
9th New York . . .	May to September 12	141	323	21	41
Total		1584	3732	152	261

Some explanation of this table may be desirable. The first column gives the name of the regiment; the second column indicates the period of time covered by the reports from which the data are taken. Some of the regiments were mustered out early in September, while others continued in service throughout November and even later. The third column gives the number of recorded typhoid cases in each regiment; the fourth column gives the number of cases of typhoid fever in each regiment, according to our estimate, after going over the regimental and hospital reports; the fifth column gives the number of deaths among the completed cases of probable typhoid fever; the sixth column gives the total number of deaths from disease in the regiment as reported to the War Department up to December 2, 1898. It will be seen from this table that twelve regiments furnished 3732 probable cases of typhoid fever, and we are quite thoroughly convinced that in this list of probable cases there are very few if any doubtful ones. This gives an average of a little more than 300 cases per regiment. In this list the smallest number of cases is furnished by the Fifth Missouri, which had 212, and the largest number by the Twelfth New York, which had 490.

We have tried to ascertain the mortality among the typhoid fever

cases, but at present we are not able to give any exact figures. The fifth column in the above table shows the number of deaths among the completed cases of typhoid fever. It must be understood that many of these deaths occurred among so-called malarial cases. This column foots up 152 deaths among the completed cases in the twelve regiments; there were 3732 probable cases in these regiments. This gives a mortality of a little more than 4 per cent. It must be understood, however, that this is altogether too low, because there is in this computation no data concerning the deaths among the incomplete cases. We have attempted to get the total number of deaths from the records in the War Department, and the sixth column gives us figures for the total number of deaths up to December 2, 1898. These figures indicate the total number of deaths from all diseases. That these figures are too low is shown by referring to the record for the Second Missouri in the above table. According to the figures furnished us by the War Department, there was, up to December 2, 1898, a total of thirteen deaths in this regiment, but the regimental and hospital records show us that up to November, 1898, there were seventeen deaths among the probable typhoid fevers only. Supposing that the deaths reported to us from the War Department were all due to typhoid fever, we would then have among the probable cases of typhoid fever a death-rate of a little less than 7 per cent. All that we can say, then, at present is that the death-rate among the probable typhoid cases at Chickamauga, as shown by these twelve regiments, was somewhere between 4 and 7 per cent., with the probabilities very much in favor of it being much nearer 7 than 4 per cent. Our general impression during our inspection of the regiments and hospitals was that the death-rate among the typhoid fevers was very low; but 7 per cent. or 6 per cent., or even 5 per cent., is not a low mortality for typhoid fever among soldiers. In civil practice we have a right now to expect a death-rate of not more than 7 per cent. This death-rate should be much less among men who are picked on account of their physical perfection. We will endeavor to get more exact data concerning the mortality.

It is a striking fact that the majority of the men who had typhoid fever had no preceding disease. We went into this work with the preconceived idea that diarrhœa and other intestinal disorders rendered men more susceptible to typhoid fever, and therefore we fully expected to find that typhoid fever prevailed more largely among those who had some form of intestinal trouble. Our studies thus far have shown us that this is not true, and that more than 80 per cent. of the typhoid fever cases do not appear upon the sick reports until they are taken with typhoid fever. As illustrating the relation between preceding intestinal disorders and typhoid fever, we will take the following from our history of typhoid fever in the First West Virginia. There were

260 cases of probable typhoid fever in this regiment. Five of these had the date of their illness in November, and four others did not belong to any company. Deducting these, the twelve companies furnished 251 cases of typhoid fever. Supposing that each company had its full quota of 106 enlisted men and three commissioned officers, then 1308 men furnished 251 cases of typhoid fever. There are 585 individuals in this regiment who are reported as having had some intestinal disorder, and apparently 723 escaped disease of this kind. The 585 persons furnished 82 cases of typhoid fever—1 to 7.13; the 723 individuals furnished 169 cases of typhoid fever—1 to 4.6. However, these figures do not represent the facts. Of the eighty-two cases of typhoid fever, forty-two were not preceded by any intestinal disorder. Therefore, 543 persons who had intestinal disorders of some kind furnished forty cases of typhoid fever—1 to 13.7; and 765 persons who had no intestinal disorder furnished 211 cases of typhoid fever—1 to 3.64. A little more than 84 per cent. of the typhoid fevers in this regiment were not preceded by any recorded intestinal disorder. It seems to us that only one conclusion can be drawn from these facts. Many of the diarrhœas must have been due to or at least accompanied by a typhoidal infection.

Another interesting thing about the typhoid fever cases is that in a considerable number of those preceded by some disorder, whether malaria, diarrhœa, or indigestion, the disorder occurred in such close connection with the typhoid fever as to cause us to believe that it was due to or accompanied by typhoid infection. The following cases, taken from the records of the Sixth Ohio, illustrate this point. It should be stated that in this regiment all the cases of typhoid fever, with two exceptions, were diagnosed as malaria or indigestion.

No. 1.—Indigestion, August 24th to 25th; malaria, August 31st to October 8th.

No. 2.—Diarrhœa, August 16th to 17th; malaria, September 20th to October 8th.

No. 3.—Indigestion, September 11th to 13th; malaria, September 24th; died October 8th.

No. 4.—Diarrhœa, September 5th to 6th; malaria, September 10th; still sick, October 31st.

No. 5.—Indigestion, September 4th to 8th; indigestion, September 15 to 16th; malaria, September 20th; still sick, October 31st.

No. 6.—Diarrhœa, August 14th and 15th; malaria, August 18th to October 19th.

No. 7.—Continued fever, September 7th to 9th; malaria, September 10th and 11th; continued fever, September 26th; still sick, October 31st.

No. 8.—Continued fever, August 12th to 16th; malaria, August 19th to September 21st.

No. 9.—Diarrhœa, August 22d and 23d; malaria, August 25th to October 25th.

No. 10.—Diarrhœa, August 13th to 16th; malaria, August 18th; still sick, October 31st.

No. 11.—Indigestion, September 15th and 16th; continued fever, September 24th; still sick, October 31st.

No. 12.—Diarrhœa, August 12th and 13th; malaria, August 19th to September 21st.

No. 13.—Indigestion, August 5th and 6th; malaria, August 18th to October 28th.

No. 14.—Diarrhœa, September 12th to 14th; indigestion, October 14th to 16th; continued fever, October 18th; still sick, October 31st.

No. 15.—Indigestion, August 16th and 17th; malaria, August 17th to September 23d.

No. 16.—Diarrhœa, August 14th to 16th; malaria, August 18th to September 21st.

No. 17.—Diarrhœa, September 6th and 7th; malaria, September 12th; died September 22d.

No. 18.—Indigestion, August 22d to 27th; malaria, August 29th; still sick, October 31st.

No. 19.—Diarrhœa, September 2d and 3d; malaria, September 5th; still sick, October 31st.

No. 20.—Remittent malaria, Sepember 6th to 8th; continued fever, September 10th; still sick, October 31st.

No. 21.—Indigesion, September 9th to 11th; malaria, September 14th; still sick, October 31st.

No. 22.—Diarrhœa, September 14th to 16th; continued fever, September 19th; still sick, October 31st.

No. 23.—Diarrhœa, August 20th and 21st; malaria, August 29th to September 1st; malaria, September 2d and 3d; malaria, September 5th and 6th; continued fever, September 29th; still sick, October 31st.

No. 24.—Diarrhœa, September 21st and 22d; indigestion, September 30th to October 3d; continued fever, October 6th; still sick, October 31st.

No. 25.—Diarrhœa, August 8th and 9th; diarrhœa, August 13th and 14th; malaria, August 20th to October 31st.

No. 26.—Indigestion, August 19th to 21st; continued fever, August 29th to October 24th.

No. 27.—Diarrhœa, August 4th and 5th; diarrhœa, August 7th and 8th; malaria, August 19th; still sick, October 31st.

No. 28.—Diarrhœa, September 12th to 14th; malaria, September 15th to 17th; continued fever, September 19th; still sick, October 31st.

No. 29.—Indigestion, September 15th and 16th; continued fever, September 25th; still sick, October 31st.

No. 30.—Simple fever, July 14th to 22d; diarrhœa, August 2d and 3d; continued fever, August 21st; still sick, October 31st.

No. 31.—Malaria, August 13th and 14th; malaria, August 19th to September 21st.

No. 32.—Indigestion, August 21st and 22d; malaria, August 29th; still sick, October 31st.

No. 33.—Simple fever, August 9th to 21st; malaria, August 26th to September 30th.

No. 34.—Diarrhœa, August 21st and 22d; continued fever, August to September 24th.

No. 35.—Diarrhœa, August 13th and 14th; malaria, August 29th to September 25th.

No. 36.—Diarrhœa, August 14th and 15th; diarrhœa, August 17th and 18th; malaria, August 29th; still sick, October 31st.

No. 37.—Simple fever, August 12th to 15th; diarrhœa, August 20th to 24th; malaria, August 29th; still sick, October 31st.

No. 38.—Malaria, September 10th and 11th; indigestion, September 14th to 16th; malaria, September 16th; still sick, October 31st.

Hundreds of cases of this kind are recorded on the sick reports. In our opinion, the preceding illnesses in many of these cases were connected with the typhoid fever infection. The most rational explanation, so far as we can see, is that in the majority of these cases the infection was a mixed one, in which saprophytic germs greatly predominated in numbers. The preceding illnesses are believed to have been due to the action of the saprophytic micro-organisms.

In our studies we have had frequent occasion to observe that among the soldiers typhoid fever was often far advanced before it was recognized. That this was a potent factor in the spread of the disease in camps must be evident. With many unrecognized cases of typhoid fever defecating in the pits and on the ground over which men walked, drinking from the same water receptacle, eating from the same mess, and occupying tents in common with others, the chances of the transmission of the specific infection was great. This is illustrated in the Eighth New York. Many cases sent from this regiment to the New York hospitals were found to be convalescing from typhoid fever when they reached the hospital, and the disease had been diagnosed malaria prior to this time.

In military experience typhoid fever is often apparently an intermittent disease. The following cases illustrate this:

No. 1.—Intermittent malaria, August 10th to 15th; diarrhœa, August 19th to 21st; remittent malaria, August 21st to 25th; advanced typhoid fever recognized in hospital, September 9th.

No. 2.—Diarrhœa, July 30th to August 5th; intermittent malaria, August 17th to 22d; remittent malaria, August 22d; granted sick leave, August 27th; sent to Presbyterian Hospital, in New York City, September 9th, with advanced typhoid fever.

No. 3.—Intermittent malaria, August 13th to 18th; remittent malaria, August 18th; granted sick leave, August 31st; sent to St. Luke's Hospital, in New York City, September 9th, with advanced typhoid fever.

No. 4.—Intermittent malaria, August 13th to 18th; remittent malaria, August 18th to 23d; granted sick leave, August 29th; sent to St. Luke's Hospital with advanced typhoid fever, September 9th.

No. 5.—Diarrhœa, July 10th and 11th; diarrhœa, July 22d to 25th; diarrhœa, July 30th to August 4th; intermittent malaria, July 6th to 20th; remittent malaria, August 23d to 24th; granted sick leave, August 27th; sent to Mt. Sinai Hospital, New York, September 9th, convalescing from typhoid fever.

Hundreds of other cases might be given to illustrate the apparently intermittent character of many cases of typhoid fever. We have stated that these are "apparently" intermittent. We do not intend to state that these apparent intermissions were afebrile. It is probable that a temperature-record would show that this was not the case. We mean that there were periods when the patient felt better, and for this reason was returned to duty.

The influence of change in location of camps upon the continuance of typhoid fever is exceedingly interesting. We have not investigated this subject as thoroughly as we hope to do. At present, however, I think that we can give the following conclusions:

(*a*) A regiment thoroughly infected with typhoid fever does not lose the disease when it changes its locality, even when it goes to a perfectly unobjectionable site and leaves all its sick behind. Evidence of this is shown in the history of the whole of the Second Division of the First Army Corps when it moved from Chickamauga to Knoxville. At Chickamauga Park this division became thoroughly saturated with typhoid fever. After reaching Knoxville, and notwithstanding the fact that the camp site was probably as fine as any in the world, the water-supply unobjectionable, the nature of the soil suitable for the digging of sinks, surface drainage good; notwithstanding all of these advantages, typhoid fever prevailed more largely than it did at Chickamauga. It is altogether probable that the clothing, blankets, and tentage of the men became thoroughly infected with the typhoid bacillus. When a regiment becomes saturated with typhoid fever, change in location alone is not sufficient to get rid promptly of the disease. We believe that it will be necessary in such a case thoroughly to disinfect clothing, blankets, tentage, etc.

(*b*) If a regiment be moved before the infection has become marked, typhoid fever may disappear or at least decrease.

(*c*) Apparently a sea voyage of some days or weeks might rid a command, not widely infected with typhoid fever, of the disease. We have some illustrations of this in the troops that went to Cuba. For intance, about half of the First Volunteer Cavalry went to Cuba, while the other half remained at Tampa. Before the departure for Cuba, and while the regiment was all together, typhoid fever appeared, and its prevalence was confined to those companies that went to Cuba. Apparently this part of the regiment lost its typhoid fever on its way to Cuba, while the part that remained behind became badly infected.

(*d*) A regiment thoroughly infected with typhoid fever does not lose the disease or lessen the number of cases after a short voyage at sea. This was illustrated by the Nineteenth Infantry, which, after becoming thoroughly infected with typhoid fever, was transported to Porto Rico. The progress of the disease apparently was not in the least retarded by this voyage.

THE COEXISTENCE OF CARCINOMA AND TUBERCULOSIS OF THE MAMMARY GLAND.

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The number of cases that have been reported of primary tuberculosis of the mammary gland is not large. Scudder (The American Journal of the Medical Sciences, July, 1898) gives an exhaustive review of this condition, with a list of eighty cases recorded as tuberculosis of the breast. Of these he rejects twenty-three as lacking in positive anatomical and bacteriological evidence; four he considers from the history to be distinctly secondary, and the remaining fifty-three cases he concludes to be the only instances of primary tuberculosis of the breast recorded in the literature. Even in a number of these accepted cases the diagnosis rests on insufficient grounds, the bacillary evidence being entirely lacking and the histological features not conclusive, so that the actual number of carefully studied cases becomes very much smaller. It is, however, probable that the disease occurs with relative frequency, but the possibilities of its escaping observation are very great. I am supported in this view by the fact that in four years' service as examining pathologist to the University Hospital I have met with five cases, three of primary and two of secondary tuberculosis of the breast. These cases are as yet unrecorded, and should be added to Scudder's list. Two of the primary cases I shall report in this article; the third one was sent to me for diagnosis by Dr. Smith, of Grand Rapids; the two cases of secondary infection were autopsy cases of chronic pulmonary tuberculosis with universal metastasis.

In spite of the probable relative frequency of this condition and the fact that carcinoma of the breast is one of our most common clinical conditions, the coexistence of the two processes in the same gland is apparently very rare. I have been unable to find in the literature a single undoubted instance of such a combination, so that the two cases to be reported here must be looked upon as being unique pathological conditions.

Case I.—Portions of a breast tumor were sent to me for examination by Dr. Carl Warden, of Ishpeming, Mich. After returning a diagnosis of tuberculosis of the breast, the following history of the case was sent to me by Dr. Warden.

Mrs. F., aged forty years, a Scandinavian, of good family history, gave birth to her last child at the age of thirty-nine. For several months previous to this conception she had had irregularity of menstruation. Delivery was normal, and the child was nursed for eleven months, having been weaned about six months before the removal of the breast-tumor. During lactation and subsequently the patient has not menstru-

ated. She has three other children, all four being alive and well. Up to the nursing of the third child both breasts were used, but at the time of the birth of this child she noticed a scarcity of milk and a general tenderness in the right gland. The nipple was "sore" and gradually became retracted. The use of this breast was finally abandoned altogether. The nipple remained permanently retracted. Two years after this the last child was born, and was nursed from the left breast alone. There were no signs of activity in the other gland. At the time of weaning this last child, eleven months after its birth, her attention was again called to the right breast by a feeling of soreness, and she discovered a lump about the size of a hazel-nut in the upper and outer portion of the breast. This was hard and tender on pressure. It grew slowly, and in three months reached the size of a hickory-nut. A month later the breast was examined by Dr. Warden, who found in the inner portion of the gland a hard, irregular mass. This was movable and not attached to the overlying skin. In a week it had increased very rapidly, involving the lower segment of the breast. Enlarged glands were found in the axilla. The patient suffered from a feeling of weight and uneasiness in the breast, and from sharp, stabbing pains radiating to the shoulder and right side. A week later the entire organ showed involvement, and the overlying skin had a reddish, mottled appearance, and in places was adherent to the growth below. A diagnosis of malignancy was made, and operation was advised. This was performed two days later. The growth in the meantime had softened, and fluctuation was evident. An exploratory incision was made below the nipple, and about an ounce of creamy pus was evacuated. The gland had a dense, stony character. A portion of its substance was taken for examination. A diagnosis of tuberculosis was returned. The diseased portions of the gland were removed. After the operation there was marked improvement, the pain almost entirely disappeared, and there was but slight tenderness on pressure. For a time there was moderate purulent discharge, but this was not offensive. The remaining portion of the gland was dense and brawny throughout, and the nipple was entirely obliterated. The patient was somewhat anæmic, but had lost no weight and showed no indications of any pulmonary complication. A letter recently received from Dr. Warden, now of Nashville, Tenn., states that the patient recovered entirely, and is now in good health.

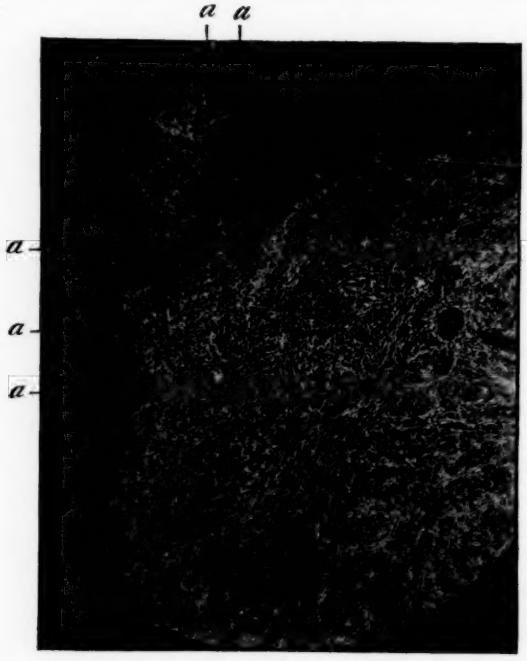
Microscopical Examination. The sections of the portions of the gland sent for examination showed numerous tuberculous nodules, varying in size from small miliary tubercles to large confluent nodules showing caseation. The tuberculous infiltration is in all cases periacinous, surrounding the acini very regularly and uniformly. This periacinous growth shows very different stages of development. In the smallest nodules the acinus or group of acini is surrounded by a mass of epithelioid tissue, containing many giant-cells and lymphocytes. The basement membrane is intact, and in some cases it has undergone a proliferation, so that the epithelium of the acinus is separated from the epithelioid tissue by a thick, concentrically arranged capsule of connective tissue. In other cases the basement membrane has entirely disappeared, and the epithelial layer lies surrounded on all sides by epithelioid cells. The epithelium in many places preserves its continuity, but the lumen of the acinus is collapsed and the two layers of cells are crowded closely together. Around these collapsed rings of acinous epithelium are numerous large

giant-cells, many having branched processes, the largest ones showing caseating protoplasm and peripherally arranged nuclei. The relations of these large giant-cells to the epithelium are very striking. In several instances the detached ring of epithelial cells is bent into a horseshoe shape by the pushing-in from one side of one of these giant-cells. In some cases the epithelium lies between three or four large giant-cells, whose protoplasm does not show caseation. These giant-cells show distinct evidences of phagocytic action, as they contain portions of epithelial cells and occasional leucocytes. Usually the nuclei and protoplasm of the epithelium are well preserved; in a few places they contain fat droplets, but where completely surrounded by the giant-cells their nuclei are lighter and less definite in outline, and the cell protoplasm is irregular and hazy. The study of the sections tends to give a distinct impression of the destruction of the epithelium by the giant-cells. Around the larger canaliculi and ducts the same tuberculous infiltration is found. Into one duct there is an ingrowth of epithelioid cells containing many giant-cells. The basement membrane and epithelial layer are intact, except at one side, through which these cells have burst and grown out into the lumen. In a few instances large branched giant-cells could be seen pushing through the basement membrane, and between the epithelial cells out into the duct. There is throughout the appearance of an invasion of the glandular structures by an epithelioid tissue arising in the connective tissue. In several places the gland tissue has entirely disappeared, and a large, caseating area of epithelioid tissue, abundantly infiltrated with lymphocytes, is found. This tissue is very poorly supplied with bloodvessels, but contains large lymph-spaces. In one portion of the material examined there was found a large abscess cavity, its walls consisting of necrosing leucocytes and epithelioid cells.

In many of the larger epithelioid nodules which have completely surrounded and obliterated the gland-structures the epithelial cells of the gland remain living and well preserved, surrounded by and in intimate contact with the new tissue. In some cases they are separated from each other, in other instances they are still united. In these loosened epithelial cells of the gland, lying free from their basement membrane in the lymph-spaces formed by the new cells of the tuberculous growth, there is in many instances a marked tendency to proliferation. Cell-division forms are abundant, both mitotic and amitotic, chiefly pathological forms of the latter type, forming cells with large, irregularly branching nuclei. This abnormal growth of the glandular epithelial cells can be traced in various stages from its beginning to the formation of definite carcinomatous masses. These are usually surrounded by the tuberculous tissue, but in some areas the growth of the carcinoma has exceeded that of the former, and the latter has broken through into the gland structure outside. Certain areas, therefore, show a well-marked growth of a carcinoma simplex. The study of the sections certainly tends to give the impression that the epithelioid growth is the primary condition; that secondarily to this a carcinomatous proliferation has been excited in those gland cells which have been separated from their normal relations with each other and with their basement membrane. The cells of epithelial origin can in all cases be easily separated from those of connective-tissue growth; their nuclei are larger, more uniformly oval, and contain much more chromatin, the cell pro-

toplasm being more abundant and more granular. They do not bear any close resemblance to the epithelioid tissue surrounding them.

Carcinomatous proliferation is also found in several of the ducts surrounded by the hyperplastic basement membrane. The connective tissue of the organ is very œdematous and infiltrated throughout with leucocytes. The staining for tubercle bacilli was successful, but the germs were found in scanty numbers. The pus obtained from the wound was stained by Dr. Warden, without success. An examination of a small quantity sent to this laboratory showed a few beaded bacilli. A guinea-pig was inoculated with this pus, but its death and post-mortem occurred in my absence, and nothing definite was obtained.



Photograph of portion of section taken from Case II., showing the border between the carcinoma and the tuberculous zone. To the left is the epithelioid growth with numerous giant-cells (*a*); to the right is the carcinoma. Zeiss, 17 mm.

Case II.—Mrs. E. D., aged thirty-nine years, was admitted to the University Hospital on October 2, 1893. Her father died of "catarrhal inflammation" of the lungs. Her mother had lost two sisters and one uncle from "cancer." Otherwise the history is negative. Ten months before admission she had first noticed a small lump below the nipple. She had been struck at this point by the handle of a pitch-fork five months before. Her physician punctured the swelling and told her that she had an "enlarged milk gland." After the puncture the growth

increased in size very rapidly, and gave her very severe pain. The breast was removed and the axilla cleared by Dr. Nancrede on October 5, 1893. The immediate result was good, but nothing has been heard from the patient since.

The breast and axillary glands were put into Müller's fluid, and not examined until nearly two years afterward. On cutting up the hardened material for class use it was found that both the mammary tumor and the axillary glands presented a unique picture of combined carcinoma and tuberculosis. The great mass of the tumor consisted of pure carcinomatous tissue, for the greater part a carcinoma simplex, but in many places of a medullary type. The tumor cells show large areas of simple necrosis, and there is a marked myxomatous degeneration of the stroma in many places. Around the periphery of the growth there is a broad zone of tuberculous tissue made up of miliary epithelioid tubercles. The majority of these show caseating centres. Between and around the nodules there is an abundant infiltration of lymphocytes. Giant-cells are very numerous, and are unusually large and prominent. For the most part they show caseating protoplasm and peripherally arranged nuclei. The tuberculous tissue and the carcinomatous growth are for the greater part distinctly separated from each other. Only in a few places do the carcinoma cells surround the tubercles, and there are no tubercles growing in the mass of tumor tissue. In the coarser trabeculæ extending into the tumor tubercles are found surrounding the remains of the gland structures. The chief growth of the tuberculous process is on the outside, and the carcinoma is practically surrounded by a zone of tubercles. That the carcinoma has been more rapid in its growth than the tuberculosis is evident by the compressed appearance of the outer zone, where the epithelioid nodules have somewhat of a concentric arrangement.

The appearance is the same as in the axillary glands. The greater part of each gland is made up of carcinomatous tissue, which is surrounded by a zone of tuberculous tissue made up of epithelioid nodules, showing caseation and containing many giant-cells. There is in all of the glands a preponderance of the tumor growth over that of the tuberculosis.

The staining for tubercle bacilli was negative. This may have been entirely due to the long period of hardening in Müller's fluid. The diagnosis in this case is, therefore, based wholly upon the histological appearances. The numerous miliary nodules of epithelioid tissue without bloodvessels, showing caseation centres and possessing numerous giant-cells having peripherally arranged nuclei, present a very characteristic picture.

The relations of the two processes appear to be very different from that in the first case described above. There the impression was obtained of a beginning carcinomatous process secondary to a primary tuberculosis; here the carcinoma appears to be the primary process and the tuberculosis the engrafted one. The appearances speak for a more recent infection of the latter condition, possibly at the time of the exploratory puncture. The relations of the two processes in Case II. appear to me to be wholly accidental, while, on the other hand, the study of the conditions in Case I. inclines me to the belief that there may be some definite etiological relation between the two processes.

The doctrine set forth by Rokitansky that carcinoma and tuberculosis are never found together, or, as later modified by Dittrich and Martius, that both of these processes never appeared in the same organ, has been overthrown by numerous observations. Lebert, Virchow, Wagner, Friedrich, Weber, and many others have shown the coexistence of the two processes in the same individual, while other investigators have found it to occur in the same organ. Friedländer, Wolf, and Schwalbe have described the occurrence of carcinoma in lung caverns in cases of chronic pulmonary tuberculosis.

Lubarsch found multiple carcinomata of the ileum showing tuberculous infiltration, primary lung carcinoma in chronic pulmonary tuberculosis, and metastatic carcinoma in areas of fresh tuberculous infiltration of the lung. Zenker affirmed that there was no local immunity, and reported two cases of the presence of tuberculosis and carcinoma in the same organ. In one case of cancer of the larynx and in one of the œsophagus he found caseating miliary tubercles, and in the latter case demonstrated the presence of tubercle bacilli.

Cordua described a similar case. Crone found tuberculous tissue in a carcinoma of the larynx. Baumgarten saw tubercles in cases of cancer of the larynx and rectum. Friedländer claimed (but never published details) to have found tubercles in the scar of a rodent ulcer. Köster also claimed to have found tubercles in cancers of the lip and mammary gland, but no published reports exist of these.

Ribbert believed that he had seen the histological structure of tuberculosis in eleven cases of carcinoma, six of the lip, and one of the mouth, tongue, gum, eyelid, and penis. His diagnosis was made chiefly upon the presence of giant-cells, and is not conclusive.

Crawford described a scirrhus of the mamma associated with an abscess. No giant-cells or bacilli were found in the gland, but the axillary glands showed a characteristic picture of both tuberculosis and carcinoma. The positive diagnosis of tuberculosis is lacking in this case.

In 495 cases of tuberculosis and 111 cases of cancer Loeb found thirty-one cases of the coexistence of the two diseases in the same individual. Clements reports three cases—carcinoma of the lower jaw with tuberculosis of the cervical glands; carcinoma of the mamma with tuberculosis of the axillary glands on the same side, and cancer of the stomach with tuberculosis of the liver. He also reports a case of endothelioma of the parotid combined with tuberculosis.

Numerous observers have described cases of lupus combined with epithelioma. It would seem that while the coexistence of tuberculosis and cancer is rare, it is found more frequently in the skin than elsewhere.

Sarcoma have also been found combined with tuberculosis, and Reich has described a case of brain tumor in which there was the picture of the combination of tuberculosis and glioma.

Over the question of the relation between the two conditions very different views are held. In the various cases of lupus carcinoma that have been studied the majority of observers believe that the tuberculosis is primary, and is the exciting cause of the carcinomatous proliferation. Crone holds that tuberculosis acts as an irritant and lessens the resistance of the tissue, so that specific tendencies toward the formation of carcinoma are excited. Zenker believes in two possibilities: either the tubercle bacilli act as a chronic inflammatory irritant and lead to epithelial proliferation, or the necrotic tumor tissue becomes the point of entrance of infection by the tubercle bacillus.

On the other hand, Cordua and Baumgarten believe that in their cases the carcinoma is the primary and the tuberculosis the secondary condition. Cordua is of the opinion that tubercle bacilli passed from the diseased lung into the œsophageal carcinoma by way of the lymph vessels. Köster also looked upon the tuberculous process as a secondary infection of the carcinoma.

While it cannot be denied that a primary carcinoma may later be infected, it is also believed by many competent observers that lupus carcinoma is a secondary development on a tuberculous foundation. The question then arises if this same relation may not be found in cases of coexistence of the two processes in other organs. According to Ribbert, the primary nature of the carcinoma in the cases of Cordua and Baumgarten is not strongly evident, and in his own cases he holds that the tuberculosis is the exciting cause of the carcinomatous growth. This belief he bases upon his own peculiar theory of the origin of carcinoma. In brief, he holds that all epitheliomata arise from a connective-tissue growth beneath the epidermis, by which a subepithelial granulation tissue is formed. This grows outward, causing a lengthening of the papillæ. Connective-tissue cells penetrate between the epithelial cells, push them apart, and isolate them. In these isolated groups of epithelial cells a proliferative tendency is set up, so that they grow and penetrate into the deeper parts of the tissue, thus giving rise to a carcinoma.

This, according to Ribbert, is the condition in lupus carcinoma. In lupus there is a subepithelial granulation tissue produced by the chronic inflammatory process set up by the presence of the tubercle bacilli. As the result of the outgrowth of this granulation tissue there is a lengthening of the papillæ, and in this growth epithelial cells may be separated and so lead to the appearance of carcinoma. Believing that the origin of lupus carcinoma may be explained in this way, Ribbert endeavors to extend this theory to the combination of the two processes in other organs, and looks upon the carcinomatous growth as the result of the tuberculous process. If the tubercles are very small, or even fail, he holds it as conceivable that the carcinoma exceeded the tuberculosis in rapidity of growth.

In his investigations over the histogenesis of cancer he many times observed the presence of giant-cells in the connective-tissue stroma of cancers. He mentions eleven cases of carcinoma in which these giant-cells were found (see above), and from the presence of these cells and the nodular appearance of the tissue in which they were found he makes a diagnosis of tuberculosis. He was unable to find tubercle bacilli. He excludes the possibility of the giant-cells being caused by lepra-bacilli, actinomyces, syphilis, animal parasites, or foreign bodies. He does not believe that they are formed as a reactive proliferation of the tissue against the in-growing epithelium, and from the conditions present does not believe that the epithelial cells act as foreign bodies upon the cells of the tissue. He further believes that they are not formed by cancerous proliferation. Having thrown out everything else by exclusion, he fixes upon tuberculosis as the cause of their formation. Even without the formation of definite nodules, he is inclined to look upon the presence of the giant-cells as evidence of the tuberculous nature of the process. He further confirms Köster's observations over the presence of tubercles in cancer.

The question, then, arises, What is the relation between the carcinomatous and tuberculous processes? It is possible, as Cordua affirmed, that the tuberculosis is secondary, and is the result of infection from the outside world, or comes from other parts of the body through the lymph vessels. Moreover, bacilli circulating in the blood may grow in the carcinoma as the place of least resistance. This is especially likely to happen in individuals having tuberculosis in other parts of the body.

On the other hand, the tuberculosis may be the primary condition. Ribbert believes this to be conclusively proved in two of his cases by the early stage of the carcinoma and the greater growth of the tuberculosis. In other cases he thinks the growth of the carcinoma has outstripped that of the tuberculous process. Taking all in all, he believes that the position that the carcinoma is the secondary process is better supported than the opposite view, and that, as in lupus carcinoma, the development of a subepithelial granulation tissue produced by the tubercle bacillus favors the formation of carcinoma according to his theory of the formation of epithelial tumors. He also points to the fact that lupus frequently produces epithelial formations of a benign character, and thinks it possible that these may be an early stage of carcinoma which later become malignant, just as other benign epithelial growths may become malignant.

He explains the fact that carcinoma so rarely develops in tuberculous individuals by the rapid caseation and ulceration which are the most common features of tuberculous processes; and that the tubercle bacilli rarely produce such chronic changes as in lupus, where the conditions harmonize with those necessary for his view of the origin of

carcinoma. Ribbert, therefore, sums up the matter as follows: "That tuberculosis, in a part of the cases of carcinoma, is that agent which excites the subepithelial proliferation which is the foundation of the origin of carcinoma. In other cases other inflammatory agents may come into play."

Loeb believed that the combination is only accidental, but recognizes the possibility of the origin of carcinoma through the agency of the tubercle bacillus. He also holds it as undoubted that the cachexia of cancer prepares a suitable soil for tuberculous infection.

Lubarsch, basing his statements upon the findings of 6536 autopsies, found that the combination of the two diseases is not rare, but that it occurs significantly with greater rarity than each condition alone. He found that carcinoma occurred three times more frequently in non-tuberculous individuals than in those having tuberculosis, and that in non-carcinomatous individuals the occurrence of tuberculosis is more than twice as frequent as in carcinomatous. He gives five possibilities of the combination of the two conditions:

1. Purely accidental. Half of all the cases fall into this category.

2. Metastatic carcinoma in or near old or fresh tuberculous processes. Through the cachexia of cancer new tuberculous eruptions may follow old lesions. Such cases are not rare.

3. A fresh infection of tubercle bacilli may occur in a well-developed carcinoma. These cases are rare. He could find but three cases in his material.

4. A carcinoma may arise in a progressive chronic tuberculosis. The tuberculous process acts as the predisposing cause in a manner similar to that of acute or chronic trauma in favoring the development of carcinoma.

5. The hypothetical entrance of both conditions at once. He was not able to confirm this clinically or anatomically.

To explain the relative rarity of the coexistence of the two processes Lubarsch believed that age was not a sufficient factor, but that possibly the blood or tissue juices showed fine chemical changes which hindered or influenced the development of tubercle bacilli or other organisms. Other acute infections are also rarer in carcinomatous individuals than in non-carcinomatous individuals of the same age. That important blood changes do take place in carcinoma is well known, and it seems probable that such changes must have some significance in the relation of the body to infective agents.

Zenker, Loeb, and Cordua in essential confirmed Lubarsch's conclusions, and only Ribbert opposed them with any force. Basing his claims upon the views given above, he again asserted that the tuberculous process could be a direct etiologial agent in the production of carcinoma.

Clements criticised Ribbert's diagnosis of tuberculosis from the presence of giant-cells alone. His three cases mentioned above he puts into the first and second category of Lubarsch. He sums up with the statement that the coexistence of tuberculosis and carcinoma in lymph-glands is the result of a cancer metastasis, and that carcinoma predisposes locally to the excitation of a latent tuberculosis. In consequence of this local predisposition tuberculosis may develop in rare places as the liver and axillary glands, the advent of the tumor in the tuberculous gland giving the picture of an infection of the carcinoma with tuberculosis.

Schwalbe believes that in his case the tuberculosis is the older process and puts it into the fourth category of Lubarsch. He opposes Ribbert's theory, and holds that there is no etiological relation between the two processes.

To return to my own cases, the histological appearances in Case I. certainly seem to bear out Ribbert's view, and lead me to believe that here, as in lupus, the tuberculous process may act as the primary factor in changing the normal environment of the gland cells, and so exciting in them specific tendencies toward carcinoma. But I have never seen a similar case, and must believe that the relation is an extremely rare one, and cannot accept any broad application of it in the explanation of the etiology of carcinoma. Moreover, I must agree with those who have criticised Ribbert's diagnosis of tuberculosis as being inadequate and unsatisfactory. The close etiological relation of the two conditions yet remains to be proved.

My second case I should put into the third category of Lubarsch, and consider the tuberculous process to be a secondary infection of a carcinoma. As stated above, the infection may have occurred at the time of the puncture. The metastasis into the axillary glands I also consider to be later than that of the carcinoma.

In conclusion, I should say that the coexistence of tuberculosis and carcinoma of the mamma is a rare condition, and may be purely accidental, or the tuberculous process may appear to be the exciting cause of the carcinomatous proliferation.

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CONCERNING KERNIG'S SIGN IN MENINGITIS.[1]

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In 1884 Kernig,[2] of Russia, described a phenomenon which he thought was found only in affections of the pia mater, and which was never lacking in inflammations of that membrane. If a patient with meningitis be made to sit up, as on the edge of the bed, the thigh therefore being at a right angle with the body, it is found extremely difficult to extend the leg because of the presence of a marked flexor contracture. To quote Kernig: "The phenomenon is so striking, the difference between nothing and something ('zwischen null und etwas'), between the complete absence of the contracture while the patient is lying down, and its presence when the patient sits up, is so plainly perceptible that it is well worth while to pay special attention to this symptom and to examine for it in every case."

Kernig saw fifteen cases of meningitis, in all of which he found the symptom. In eight cases there was confirmation of the diagnosis by autopsy. Of the fifteen cases thirteen were epidemic cerebro-spinal meningitis, one tuberculous, one suppurative. Kernig failed to find the sign in many diseases other than meningeal affections. In six cases, however, where there was not acute meningitis, the sign was more or less marked; yet in all these he found some pial trouble—œdema, intermeningeal hemorrhage, circumscribed meningitis, chronic meningitis, general carcinosis. Kernig believed the sign appeared in meningitis as early as the rigidity of the neck, and that it is late to disappear.

Kernig's sign seems to have attracted comparatively little attention for fourteen years. Most of the standard text-books on nervous diseases make

[1] Read at the fourteenth annual meeting of the Association of American Physicans, at Washington, May 2, 1899.

[2] Kernig: Berliner klinische Wochenschrift, December 29, 1884.

no reference whatever to it. Some authors describe the phenomenon, but disclaim any individual responsibility for the correctness of the statement by bracketing Kernig's name after the statement (*e. g.*, Oppenheim). Still others state briefly that it is rarely found. "A peculiar, but as it appears extremely uncommon, symptom is the so-called flexor contracture of Kernig." (Hirt, p. 14.) Until Netter, in 1898, revived interest in the subject there are, so far as I can discover, but four writers who recorded the results of their clinical observations on this phenomenon: Bull (1885), Henoch (1886), Friis (1887), and Blümm (1889).

Bull[1] wrote to show that the sign was not pathognomonic of meningitis or even of pial trouble, but merely indicated an increase in intracranial pressure. He found the flexor contracture in three cases, one of tuberculous meningitis with no autopsy, one of solitary tubercle of the cerebellum, but "in the pia over it a few miliary tubercles," with tuberculosis in the lung, lymph-glands, kidney, and intestine; one of otitis media with caries of petrous portion, thrombosis of transverse sinus, and common jugular. In the basal pia, especially over the frontal lobe, were ecchymoses, and there were a few teaspoonfuls of serum in the posterior fossa. These cases, it seems to me, go rather to prove Kernig's statement, that his sign is found with affections of the pia mater, than Bull's, that it is not indicative of meningitis or even of involvement of the pia; for, on Bull's own showing, one of his three cases was tuberculous meningitis, another had miliary tubercles in the meninges, the other certainly some local meningitis, with numerous ecchymoses and an unusual amount of serum.

The most extended observations are those of Friis,[2] of Copenhagen. During an epidemic of cerebro-spinal meningitis the examination for Kernig's phenomenon was made in sixty out of 110 cases. In fifty-three of the sixty the sign was present—*i. e.*, in 88 per cent. In two of the remaining seven it was doubtful, in two the examination was unsatisfactory, in three the sign was absent. Friis was unable to state how early it appeared or how late it remained. He found no relation between it and stiffness of the neck, hyperæsthesia, or pain, though he was inclined to think it was more pronounced where lumbar pain was most complained of. Friis has no explanation to offer as to the cause of the phenomenon, but does not agree with Bull in regarding it as due solely to intracranial pressure, as he has seen it absent in a case of hydrocephalus.

[1] Eduard Bull: Berliner klinische Wochenschrift, 1885, No. 47, p. 772. Ueber die Kernigsche Flexionscontractur der Kniegelenke bei Gehirnkrankheiten.

[2] Albert Friis: Om den i Kjobenhavn i Aaret, 1886 Herskende Epidemi af Meningitis Cerebrospinalis. Thesis, 1887, p. 154.

In an epidemic in Copenhagen in 1891 Friis[1] found the sign in twenty-one of twenty-six cases (80 per cent.).

Henoch,[2] in 1886, reported on the Kernig sign. His later views can be gathered from his reference to it in his *Kinderkrankheiten*, seventh edition, p. 320. He has found the Kernig contracture present in many cases of meningitis, but does not regard it as pathognomonic, as he has in at least one case with autopsy found no contracture; and he thinks it may be present without meningitis.

Blümm[3] found Kernig's sign in seven out of nine cases of meningitis.

Last year, 1898, Netter,[4] in examining twenty-five cases of meningitis, found Kernig's sign present in twenty-three (92 per cent.), some cases abortive, others advanced, two convalescent. Eight cases were tuberculous, three mixed tuberculous and epidemic, twelve epidemic. One of the exceptional cases was a child seen but once, the other a child living at the time of the communication with evidences of advanced tuberculous meningitis. Netter believes its presence permits one to assert quite positively the existence of a meningitis. He regards it as of especial value in the diagnosis of abortive types of epidemic meningitis. From its persistence into convalescence (Kernig, Henoch, Netter) it may be of service in enabling one to make a retrospective diagnosis.

A still more extended experience with forty-seven cases is reported by Netter.[5] He found the test positive in about 90 per cent. of cases of meningitis.

My own observations have been made upon nineteen cases of meningitis, with autopsy in eight cases. All doubtful cases have been excluded. Nine were epidemic cerebro-spinal meningitis, seven were tuberculous, two were pneumococcal, one was syphilitic with an acute process superadded. These cases, for convenience of reference, have been arranged in tabular form. I take this opportunity of thanking the physicians who gave me the opportunity of examining some of their patients, and in particular Drs. Billings and Preble, who courteously extended to me the freedom of their wards at the Cook County Hospital.

[1] A. Friis: Ugeskrift for Laeger, 1892, pp. 407 and 431, cited by Netter.

It is interesting to note that in studying these cases Friis found and described an intracellular diplococcus evidently the intracellularis. His figure on page 27 of his thesis is an excellent representation of the specific organism. He does not, however, declare it to be the specific germ, though questions its identity with Fränkel's pneumococcus.

[2] Henoch. Charité Annalen, 1886, p. 575.

[3] Blümm: Münch. med. Woch., June 25, 1889.

[4] Netter: La Semaine Médicale, 1888, p. 281. Clinical lecture delivered at Hôpital Trousseau.

[5] Bulletin et Mémoires de la Société Médicale des Hôpitaux de Paris, 22 Juli, 1898. Abstract in Deut. Med. Woch., Jan. 26, 1899.

TABLE I.—SHOWING CASES OF MENINGITIS EXAMINED FOR KERNIG'S SIGN.

No.	Date.	Name, age, sex.	Where seen.	Day of disease.	Clinical symptoms.	Kernig's phenomenon.	Result.	Autopsy.	Remarks.
1	Sept. 30, 1898	..... adult, F.	C. C. Hospital, Dr. Preble.	?	Fever, delirium, rigid neck, swollen joints, paralysis of some of ocular muscles.	Marked.	Died.	Pneumococcus septicæmia, with suppurative arthritis, pericarditis and meningitis	
2	Oct. 7, 1898	? adult, color'd, M.	C. C. Hospital.	12th	Old cough, slightly dull at one apex. chest elsewhere hyper-resonant, emaciation, cyanosis, rapid respiration, fever, delirium; T.B. in sputum. Diagnosis: miliary tuberculosis. On Oct. 5th, no rigidity of neck and no Kernig; on Oct. 7th, neck rigid and retracted, and Kernig pronounced.	Marked; can lift patient from bed without the knees yielding in extension.	Died.	No autopsy.	Of interest to note absence of Kernig at first, but appearance later as evidence of meningeal involvement became marked.
3	Oct. 16, 1898	R. adult, M.	Drs. McNeal and Heywood.	8th	Headache, vomiting, temp. 99–102°, delirium, insomnia, involuntaries; no spleen; neck rigid, facial paresis; no evidence of syphilis, no benefit from iodides.	Present.	Died.	No autopsy.	Meningitis, probably tuberculous.
4	Oct. 30, 1898	..... Adult, color'd, M.	C. C. Hospital.	?	Fever, semicoma, rigid neck, right ptosis, etc. Diagnosis: Tuberculous meningitis.	Present.	Died.	Autopsy: tuberculous meningitis.	
5	Nov. 15, 1898	Willie, 10 yrs. M.	C. C. Hospital.	9th	Headache, delirium, later coma; strabismus, rigidity and retraction of neck, unequal pupils, neuro-retinitis, temp. 99–101°, herpes labialis.	Present.	Died.	Autopsy: meningitis.	Nature of meningitis not determined bacteriologically; probably epidemic.
6	Dec. 2, 1898	..... adult, M.	C. C. Hospital.	?	Alcoholic and syphilitic; headache, thick speech, rigid neck and jaw, involuntaries, emaciation, cyanosis, rapid respiration. A micrococcus in smears from lumbar puncture.	Present.	Died.	Autopsy: syphilitic meningitis with acute process superadded.	

7	Dec. 6, 1898	M. 48 yrs. M.	C. C. Hospital.	?	Brought in unconscious; temp. 101°, hyperæsthesia, rigidity of neck; diplococcus by lumbar puncture; mind clearer after lumbar puncture.	Marked.	Died.	Autopsy: cerebro-spinal meningitis.	
8	Dec. 17, 1898	W. 4 yrs. F.	Dr. Pigall.	14th	Prodromal irritability, headache; five days ago convulsion; later rigid and retracted neck, and coma; pupils unequal; Cheyne-Stokes respiration, emaciation, patellar reflexes slightly exaggerated.	Not present, or very slight	Died within a few hours after examination.	No autopsy.	Diagnosis: tuberculous meningitis.
9	Jan. 11, 1899	..... 25 yrs. F.	Dr. Urheim.	7th	Empyema one year before; operation; two later operations, but sinus still remaining; for several days headache, bewilderment, delirium, temp. 100°; no rigid neck or paralysis at time of examination.	Present.	Died two days later.	No autopsy.	Probable tuberculous meningitis secondary to primary pleural tuberculosis.
10	Jan. 16, 1899	S. 3 yrs. M.	Dr. McCullough	8th	Influenza, pneumonia, suppurative otitis; for about four days stupor; temp. 100 to 104°; constipation, retention of urine; neck retracted and stiff; lung still consolidated; no paralysis, but great laxity of all muscles; only by severe pinch or firm supra-orbital pressure can even a slight turning of the hand be produced; no patellar reflexes.	Not present in right leg, in left very slight.	Died 20 hours after examination.	No autopsy.	Pneumonia, metapneumonic otitis and meningitis.
11	Feb. 20, 1899	B. B. 27 yrs. F.	C. C. Hospital.	Several	Two years ago nursed husband with consumption; one year ago pleurisy. Before admission severe headache and convulsions, delirium, strabismus, retinitis, retracted neck, "ganglion" on hand; lumbar puncture negative; cyanosis, rapid respiration, tender abdomen, temp. 99–102°.	Present.	Died.	Autopsy: old tuberculous pleurisy, solitary tubercles in brain, with general miliary tuberculosis; some small tubercles in meninges.	
12	Feb. 22, 1899	..... adult, M.	C. C. Hospital, Dr. Billings.	Several	Sore-throat, headache, delirium, herpes, petechiæ, retracted neck, diplococcus intracellularis from cerebro-spinal fluid; coma on eighth day.	Marked.	Died.	Autopsy: epidemic cerebro-spinal meningitis.	
13	Feb. 26, 1899	S. 17 yrs. F.	Dr. T. E. Roberts	17th	Tuberculous family history; prodromal irritability of temper; headache, becoming extremely severe and constant, temp. for 17 days 99–103°; delirium, retraction of neck, variable pulse, ptosis, Cheyne-Stokes, coma, rapid pulse; no spleen, spots or Widal.	Present in lt. leg; in rt. leg, by constant, gentle force, the leg straightens out, giving way with a sort of snap.	Died, 56 hours after examination.	No autopsy.	Diagnosis: tuberculous meningitis.

No.	Date.	Name, age, sex.	Where seen.	Day of disease.	Clinical symptoms.	Kernig's phenomenon.	Result.	Autopsy.	Remarks.
14	Mar. 22, 1899	A. L. 8 yrs. M.	Presb. Hosp., Dr. Cotton.	20th	Headache, vomiting, delirium, rigid neck, coma, variable pulse; temp. 99–103°+; leucocytosis (22,000); lumbar puncture negative; great emaciation.	Present continuously from Mar. 22 to May 2.	Recov., with deafness.	.....	Diagnosis: epidemic cerebro-spinal meningitis
15	Mar. 24, 1899	V. 25 yrs. F.	C. C. Hospital, Dr. Roberts.	7th	Headache, tender and rigid neck, muscular twitchings, tâche cerebral, delirium; temp. 100–104°; lungs, heart, etc., negative.	Marked.	Died.	No autopsy.	Diagnosis: meningitis, probably epidemic.
16	Mar. 24, 1899	W. B. adult. M.	C. C. Hospital, Dr. Preble.	?	Coma, restless, rigid neck, slight ptosis; temp. 103–104°, pulse 66–88, albumen; an abundant diplococcus by lumbar puncture.	Marked; Kernig also present just before death, though not as marked as day before.	Died.	No autopsy.	Epidemic meningitis.
17	Mar. 25, 1899	C. R. 41 yrs. M.	C. C. Hospital, Dr. Billings.	?	Headache, slight rigidity of neck, stupid even to falling out of bed, involuntaries; temp. 98–100°; diplococcus by lumbar puncture.	Present.	Recov.	.....	Probable epidemic meningitis.
18	Mar. 26, 1899	Geo. S. color'd, 30 yrs. M.	Dr. F. B. Earle.	29th	Onset with headache, vomiting; delirium, retracted and rigid neck, pulse rarely over 100, temp. 97–104°, involuntaries, resp 24–34; no cyanosis, leucocytosis; no plasmodia, no Widal.	Present.	Recov.	.....	Epidemic cerebro-spinal meningitis; on May 1st, there was no Kernig present; patient able to walk.
19	April 2, 1899	N. 2½ yrs. F.	Dr. Pigall.	3d	At first feverish, wanting to lie down; mother thought "bilious" and gave oil; next day convulsions and fever, stupor, "gritting of teeth," jerkings, coma, eyes half open, left eye reddened and with muco-pus on globe, neck rigid when attempt is made to move it, and whole body then quivers; temp. 102°+; pulse 160, respiration irregular, lungs negative.	Present.	Died, in 12 hrs.	No autopsy.	Meningitis, probably epidemic.

From the table it will be seen that Kernig's sign was present in seventeen out of nineteen cases of meningitis, or in 89.4 per cent. In the two cases in which it was absent, both children, the single examination was made a short time before death, and it was noticed at the time that there was a general marked laxity of all the muscles, in the one case there being but the faintest movement of an arm in response to firm and long-continued supraorbital pressure. This recalls the fact that even the retraction and rigidity of the neck muscles may be variable, and just before death may entirely disappear. "In patients deeply comatose and shortly before death I have frequently seen the stiffness of the neck disappear."[1] Kernig's sign may have been present earlier. Friis states that it may vary in degree from day to day. In most of the cases examined the other signs were so unequivocal as to make the examination for the Kernig phenomenon wholly unnecessary except as a confirmatory finding. In some of the cases, however, its presence was of distinct value from the paucity of the common evidences of meningitis—*e. g.*, in cases three and nine. And in case two—one of miliary tuberculosis—it was of special interest to note the absence at first of Kernig's phenomenon and its later appearance at the same time with the other evidences of meningeal involvement—retraction and rigidity of neck, severe headache, paralysis of ocular muscles.

Netter,[2] in a footnote, cites an extremely instructive case showing the value of the Kernig phenomenon. In a typhoid with typical symptoms, including the agglutination test, Kernig's sign was marked. But from the absence of other pronounced meningeal symptoms meningitis was excluded. Death occurred in the third week from perforation. The autopsy revealed typhoid, and also a cerebro-spinal meningitis due to the staphylococcus pyogenes and the bacillus typhosus.

Many patients with diseases other than meningitis were examined as to the existence of Kernig's phenomenon, there being selected as many cases as possible in which there were cerebral symptoms. Many individuals of all ages who were in apparently perfect health were examined. In twenty-five healthy individuals selected at random no Kernig sign was present. In 100 cases of disease other than meningitis Kernig's sign was absent in ninety-eight and present in two. The result is shown in the following table:

[1] Eichhorst. 4th edition, iv. 473.
[2] Netter. La Semaine Méd., 1898, p. 282.

TABLE II.—SHOWING CASES OTHER THAN MENINGITIS EXAMINED FOR KERNIG'S SIGN.

No. of cases examined.	*Diagnosis.*	*Kernig's phenomenon.*
25	Healthy individuals from infancy to old age, both thin and fleshy	Absent.
5	Pneumonia	"
3	Convalescent pneumonia	"
2	Pneumonia with delirium tremens	"
5	Delirium tremens	"
1	Tetanus; fourteen days after injury, trismus, convulsions, fever, mild delirium	"
2	Uræmia	"
3	Malaria	"
1	Convalescent malaria	"
3	Typhoid fever	"
5	Cerebral hemorrhage	"
1	Cerebral thrombosis	"
3	Cerebral syphilis	"
1	Tumor of brain	"
1	Subdural hemorrhage (autopsy)	Present.
1	General paralysis of insane	Absent.
1	Multiple sclerosis with spasticity	"
1	Ataxic paraplegia	"
2	Convalescent multiple neuritis	"
1	Tabes and hysteria	"
2	Hysteria	"
1	Incipient Graves's disease	"
2	Lead poisoning	"
1	Opium poisoning	"
1	Influenza with cerebral symptoms	"
1	Pernicious anæmia	"
2	Chlorosis	"
1	Enteroptosis	"
4	Acute rheumatism	"
4	Chronic rheumatism	"
1	Gonorrhœal rheumatism (vide text)	Present.
10	Valvular disease of heart	Absent.
1	Fibrous myocarditis	"
1	Acute endocarditis	"
5	Carcinoma of stomach	"
2	Ulcer of stomach	"
3	Asthma and bronchitis	"
1	Mastitis	"
1	Chronic nephritis	"
1	Amœbic dysentery	"
6	Pulmonary tuberculosis	"
1	Pelvic inflammation	"
1	Facial erysipelas with delirium, vomiting, high fever, headache, etc.	"
1	Loose body in knee-joint	"
1	Chronic gastritis	"

In a case of Dr. Billings, Kernig's sign was present where post-mortem a subdural hemorrhage was found with no inflammatory changes. The patient was a laborer, aged fifty-two years. Headache and forgetfulness for a few days. Found unconscious, having apparently fallen out of bed. Rigid and retracted neck, equal pupils, right facial paresis, right arm flexed and rigid. Involuntaries. Temperature on admission normal, but in twenty-four hours up to 104°, with pulse 130. After lumbar puncture temperature 98°, pulse 56. Later temperature but slightly elevated. Pulse variable. Mental condition varied from coma to quite bright intelligence. When ratonal no rigidity and no Kernig sign. When comatose Kernig's sign present. Died in coma on fourteenth day. Autopsy revealed subdural hemorrhage, left side.

It was present in the unaffected leg in a woman who had been lying in bed for four weeks with a gonorrhœal arthritis of one knee. During

this time she had lain with both knees flexed, as this was the most comfortable position. This local condition may explain the difficulty experienced in making extension in the leg so long accustomed to flexion.

The absence of the sign was of diagnostic value in the case of facial erysipelas. The patient, an adult, went to work in the morning, feeling nearly as well as usual, and returned at noon complaining bitterly of headache and nausea. "He staggered into the house like a drunken man." By 3 P.M. he was delirious, and his physician found a temperature of 104°, with, he thought, some stiffness of the neck, and diagnosed meningitis. When I saw him the next day there was still complaint of severe pain in the head; he had not slept the night before; was slightly delirious; temperature 103°. Other findings in the lungs, heart, abdomen, muscles, negative, save that breathing through the nose was difficult, as the nose seemed "stuffed up" as from a cold. There was no Kernig sign, though the patient, a fleshy man, and his wife both said they knew he would be unable to extend the leg as he sat on the edge of the bed, as he had tried it many times in his efforts to put on his shoes and stockings. In one leg extension was made with some little difficulty, but still with sufficient ease to exclude Kernig's phenomenon—a strong argument, it seemed to me, against meningitis. The next morning the nose and adjacent skin of the face showed typical erysipelas, and the case was clear, though the prevalence of sporadic cases of epidemic meningitis made one at first seriously consider the possible existence of this affection.

From the study of cases made by Kernig, Bull, Henoch, Friis, Blümm, and Netter, with the observations just recorded, it seems justifiable to regard Kernig's phenomenon as present in the majority of cases of meningitis—say 80 to 90 per cent.—and as only exceptionally present in other affections. Other and more definite conclusions concerning it seem unwarranted at present. That it may occasionally be absent in meningitis and occasionally present in diseases other than meningitis should not cause it to be wholly discarded as of no value. The truly pathognomonic symptoms are few. Rose-spots in typhoid, herpes in malaria and pneumonia, absence of free hydrochloric acid in carcinoma of the stomach, murmurs in endocarditis, choked disk in cerebral tumor, and scores of other symptoms are not pathognomonic, but rightly deserve attention, when found or when absent, as helping to make up or modify the symptom-complex of a disease, the method of diagnosis upon which as yet clinicians are compelled largely to rely.

As to the technique of eliciting this sign, it is exceedingly simple. The patient may be made to sit up on the edge of the bed with the legs hanging down, thus bringing the thigh at right angles to the body, when extension of the leg can be attempted; or the thigh can be brought at right angles to the body as the patient lies in bed on the side, or prefer-

ably on the back, and the leg then extended. The only requirement seems to be that the thigh should be placed at a right angle with the body before the attempt is made to extend the leg. Not infrequently in delirious patients—*e. g.*, in delirium tremens—a little, patient, gentle force must be used before the jerking and tense muscles yield. The same is true of some spastic conditions. But where Kernig's contracture is present patience and gentleness do not cause the muscles to yield, and the back of the patient can generally be lifted from the bed without the knees giving way. This procedure is often accompanied by evident pain to the patient. In some cases the leg and thigh will make an obtuse angle of no more than 110° or 120°. As Kernig says, the test in many cases is most striking, particularly in those patients where thigh and leg in the recumbent position are extended and apparently lifeless, but in the test position reveal a most intensely rigid contracture, often with evidence of acute pain. In testing for Kernig's sign there must be excluded those cases in which local causes could interfere with the proper extension of the leg, such as rheumatic or other form of arthritis of the hip or knee, myositis, old contractures from nervous diseases, and sciatica. The phenomenon can be well imitated by the latter condition.

No thoroughly satisfactory explanation of this phenomenon has been offered. Bull's notion that it is merely an evidence of increased intracranial pressure is disproven by the many failures to find the sign in hydrocephalus, in tumors, and in hemorrhage. His notion is, further, that it is but an exaggeration of a normal condition. Even in health it is often somewhat difficult to secure easy and complete extension of the leg with the thigh flexed at right angles with the body, owing to the tenseness of the muscles at the back of the thigh. Henoch[1] aptly cites the statement of Landois that the flexors of the leg springing from the tuber ischii are too short to permit of free extension of the leg when the thigh is flexed on the body at an acute angle, and he further calls attention to the fact, noted by Henke,[2] that owing to the shortness of their muscular fibres and the abundance of tendinous fibrous material the semi-tendinosus, semi-membranosus, and biceps femoris are unable to stretch far enough to permit of complete extension of the leg when the thigh is sharply flexed on the body. It is easy to assume, therefore, that in meningitis there is such an increase in tone as to exaggerate this natural difficulty of extension into a contracture of the flexors of the leg. But just how this is brought about is a matter of speculation.

[1] Loc. cit.

[2] Henke. Hand Atlas, Berlin, 1888, i. 175.

ON ASTASIA-ABASIA, WITH A CASE.

By J. C. Wilson, M.D.,
of Philadelphia.

It is a remarkable fact that the syndrome astasia-abasia has attracted so little attention in America. The earliest account of the condition, according to Knapp,* was given by Jaccoud in 1864. Weir Mitchell, in 1881, reported a case under the heading "Hysterical Motor Ataxia." Knapp's very complete paper was published in 1891. Up to that time he had been able to collect only forty-nine cases, in addition to his own, which presented "some of the symptoms of abasia, but which is not wholly typical." Of these cases thirty had been reported by French observers, and only four had been studied in this country. These were: 1. The case of Weir Mitchell, already referred to (1881). 2. That of Hughes (1890). 3. That of Hammond (1891). 4. That of Knapp (1898). Dr. Kalteyer has been good enough to look up for me the references to this curious and rare nervous disturbance since the date of Knapp's paper. He finds in the *Index Medicus* forty-three separate titles. Of these communications twenty-two are by French or Belgian and five by American physicians. The American papers are those of: 1. M. Prince (1892); 2. Bremer (1893); 3. F. R. Smith (1894); 4. Eshner (1896); 5. Diller (1896). To the nine cases hitherto reported by American observers I desire to add one recently observed in private practice.

A woman, aged twenty-four years, of good position and in comfortable circumstances, is the subject of the following note: She comes of distinguished stock, but on the paternal side there is an uncle epileptic and an aunt addicted to morphine; on the maternal, two uncles dipsomaniacs. Her father was very successful in business, had grandiose ideas, and lost a large fortune. He is now greatly absorbed in tracing geneologies. Her mother died of diphtheria. She had a sister who died of diphtheria at an early age, and one older than she who is in excellent health, but excitable. The patient had the diseases of childhood severely, but grew up in good health. She has for some years, since the death of her mother, kept house for her father, who is much preoccupied, but she has had her own friends, and is very intelligent and cheerful. Lately there was an unsatisfactory love affair. Up to this time her health had been excellent. Early in January she began to suffer from bath pruritus. January 16th, being at the close of menstruation, she was roused from sleep at midnight by a ring at the bell. She hurried into her wrapper and slippers and opened the door to receive an indifferent telegram from a member of the family in another city. The next day, on attempting to rise, she found it impossible to stand or walk. With the assistance of her maid she could cross the

* Journal of Nervous and Mental Diseases, New York, November, 1891, xvii. No. 11.

room, but unsupported she sank to the floor. She described her condition in the following terms: "My left leg feels as though it were made of cotton"—an expression already recorded—and "I feel like a combination of a child learning to walk and a drunken woman." Her people were greatly alarmed, but she treated the matter lightly. In the course of a day or two the following clinical data were collected:

The patient stated, referring to her matrimonial engagement which had been broken off, that for some months prior to the attack she had been worried. She was slightly paler than usual, but refused to have a blood examination. She had menstruated regularly and without pain. Appetite fair; digestion satisfactory; bowels slightly constipated; up to this time vomiting had not occurred. There were no signs of visceral disease. The urine is normal. Lying in bed or seated upon a chair, the lower extremities presented nothing abnormal; motor power, freedom and precision of movement, and the muscular senses were unimpaired; knee-jerks decidedly increased; ankle clonus not present; the plantar reflex intact; electrical reactions normal. There was no rigidity, ataxia, or paralysis. Sensation to touch, temperature, and pain appeared to be unimpaired. The patient complains, however, of subjective sensations of numbness and pricking throughout the left lower extremity, including the foot, leg, and thigh. Similar sensations are referred to the foot and outer surface of the right leg, but they are not felt above the knee. Upon attempting to stand her legs bend under her, and unless supported she sinks to the ground. The irregular movements of the limbs are repeated much in the same manner at each effort to stand. They correspond closely to the description of Blocq.* There are abrupt movements of flexions of the knees, followed by rapid extension; these contortions necessitate compensatory movements of the upper extremities and the head in order to maintain the equilibrium. Upon attempting to walk with some support these difficulties are increased; the body is thrown forward, the thighs and knees are abruptly flexed, and then extended. These movements are wholly irregular. With some support she is able to move a short distance, but presently her legs bend under her and she sinks to the floor. She volunteers the statement that in order to obtain an article she desired she was able to cross the room upon her hands and knees.

The patient was kept in bed and not allowed to see members of her family or friends. Valerianate of zinc, in one-grain dose four times a day, was administered in gelatin-coated pills. She objected strongly to the odor of the pills, but nevertheless took them as prescribed. Once a day she had massage of the legs and feet for forty minutes; once a day faradism with the electrical brush for twenty minutes, the current falling just short of pain. At the end of two weeks she was allowed to get out of bed. The difficulty in standing and walking was much less. She was now given lessons in standing and walking. Her nurse was experienced and intelligent, and entered fully into the plan of the treatment. Improvement was rapid, and in ten days the patient was able to go about her room, and, assisting herself by the baluster, to go down stairs for a drive. In a few days the motor disturbance and the paræsthesia had wholly disappeared. About this time distinct hysterical

* Paul Blocq. Revue Generale de Clinique et de Thérapeutique, March 14, 1889, vol. iii. No. 11.

phenomena—vomiting, intermittent tremor of the hands, vertigo, sensations of throbbing in the abdomen, emotional manifestations, weeping, and excitement without apparent cause—manifested themselves. There was no spinal tenderness; no tenderness over the so-called ovarian regions, and hystero-genetic areas were not found.

She was again isolated and placed under a systematic regimen. In the course of a month great improvement occurred, and it was thought well to send her to visit to some friends at a distance who knew nothing of her sickness or its cause.

This case corresponds to the description of the condition by Blocq, who, in 1888, collated the instances, numbering at that time eleven, and gave to the affection the name astasia-abasia, now generally received. This observer defined the condition as "a morbid state in which the impossibility of standing erect and walking normally is in contrast with the integrity of the sensibility, of the muscular strength, and of the co-ordination of the other movements of the lower extremities." (Knapp). With those who are familiar with Blocq's papers and that of Knapp it is quite unnecessary to discuss the theories of the causation of this condition. Church's statement that it is due to a systematized amnesia embodies that theory which is generally accepted. That astasia-abasia is not a nosological entity, but a syndrome, must be conceded. In the foregoing case it was a symptom of hysteria. That it is usually such a symptom, most of those who have seen cases believe. Osler speaks of it as "a manifestation of a neurosis allied to hysteria." Many of the cases have occurred in connection with organic disease. This fact does not militate against the hysterical origin of the condition, since cases of organic disease of the nervous system are often associated with hysteria.

In closing I would call attention to the expressions used by my patient in describing her condition: "That her left leg felt as though it was made of cotton," and that she "felt like . . . a baby learning to walk." It is very remarkable that this girl, who has no knowledge of medicine or medical books, should have used the very phrases so often encountered in the writings upon the subject and at once descriptive o the condition and suggestive in view of the generally accepted theory of its causation.

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EVERSION OR TURNING INSIDE OUT OF THE SAC OF A CYSTONEPHROSIS AS AN AID IN OPERATING UPON THE RENAL END OF THE URETER AND UPON THE PARTITION WALLS BETWEEN DILATED CALICES.

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I desire to describe a new method of systematic search for the ureteral opening on the inside of a cystonephrotic sac; not by "bisection," as I have described in the case of infected partial cystonephrosis,[1] but by eversion of the cystonephrotic sac through an opening large enough to permit of turning the wall inside out. This eversion of the cystonephrotic sac, combined with methodical consecutive division of the partition walls one after another, enables us gradually to lay bare and turn out for ocular inspection the whole inner wall of the sac. This is also a sure way of finding the renal orifice of the ureter. The division of the partition walls transforms the multilocular into a unilocular cavity, and facilitates drainage of urine down the ureter into the bladder.

This methodical eversion of the sac is new and superior to the method employed by Simon and, later, by myself, of inspecting the inner wall of the sac *in situ* through the opening in its wall by means of specula and reflected sun- or lamplight. This method also makes it much easier to find the ureteral orifice. I cannot see how the renal orifice of the ureter can escape being seen by this method. However, if it is nearly obliterated by stenosis from infection or inflammation, it might be impossible to see it even under these circumstances, and it might, therefore, become necessary to lay the ureter bare from below and outside of the sac, open the ureter by a small longitudinal incision, and pass a fine probe up into the sac as described by me in a former paper.[2]

[1] Annals of Surgery, June, 1896.
[2] Journal of the American Medical Association, March 10, 1894.

Another advantage of the method of eversion is the ease and promptness with which the ureteral orifice is brought into the field of operation. We do not need to wait three months or more for retraction of the sac, and then bisect the kiduey in order to find and operate on the ureteral entrance from within, but can accomplish all that is required in a single operation.

I do not, of course, know in what proportion of cases a cystonephrotic sac is so movable and so easy to handle that this eversion is feasible, but I think it likely that it would be the rule in cystonephrosis following or caused by a descended floating kidney, and would be the case as long as the cystonephrosis was aseptic—that is, not yet fixed to its surroundings by perinephritic inflammation from the infected contents of the sac.

The eversion proved in the following case to be a great help, and was probably the only means possible of finding and operating upon the renal orifice of the ureter.

CASE.—Miss C. W. was referred to me by Dr. J. V. Bacon for operation on February 21, 1898, and entered Passavant Memorial Hospital in my service. The patient was twenty-three years of age, American, single.

Family history: Negative, with the exception that her father passed stones with the urine thirteen years ago.

Personal history: Patient had the ordinary diseases of childhood, and, in addition, dysentery at the age of three years, and typhoid fever at the age of fourteen, complicated by hemorrhage from the bowels. At the ages of seven and twenty years she had attacks of jaundice, with nausea and vomiting, attended by slight elevation of temperature, but without pain in the epigastrium or the region of the gall-bladder. No clay-colored stools nor stones in the feces were observed. The second attack, in 1895, was characterized by a gradual onset of jaundice for a month, at which time she was most deeply jaundiced. This attack was attended by nausea and vomiting after all meals, and occasional nausea between meals. She was able to retain food by drinking lemon phosphate, obtaining in this way relief from the nausea. The jaundice and nausea continued until the spring of 1896. She lost some weight, but does not know how much. Since the spring of 1896 she has had no further nausea, jaundice, or other symptoms pointing to the biliary tract.

She had prolapse of the uterus at the age of fourteen, which continues to the present time. She gives no history of injury.

Present illness: In July, 1893, while at the World's Fair, the patient was seized with pain in the right mammary line an inch and a half below the costal arch. This pain came on very suddenly, was sharp, constant, and severe, and localized to an area the size of a silver dollar, and without radiations. Flexion of the right thigh caused the pain to increase in severity. She had no urinary disturbance at this time. Upon going to bed she found that while the pain lasted she could not lie on the left side, and that there was much tenderness on pressure over the painful territory, which did not alter upon change of posture from standing to lying down. There was no tenderness on

pressure beyond the area of pain. After fifteen to thirty minutes in the recumbent posture she was entirely free from pain. During, before, or after the attack she does not think she had any chill or elevation of temperature. She perspired freely and felt faint during the attack.

For the two years following she had similar attacks varying in frequency from one in seven to fourteen days to several a day. Very soon after the first attack she noticed that certain bodily movements, such as elevation of the right arm above the head, flexion of the trunk to the left, or any movement that produced extension of the muscles on the right side brought on the pain. Most of the time she was forced to sleep with the right thigh semiflexed. Extension apparently caused a feeling of tension on the right side of the abdomen, and was followed by an attack. She found that lying down for fifteen or twenty minutes would give her relief from the attacks. By going to bed in the beginning of the attacks she was able to abort them or cut short their duration.

During or preceding attacks she had no unusual desire to pass urine, but a month or two after the first attack she noticed that about the time the pain subsided, or a few minutes thereafter, she had a desire to urinate and passed from two to four ounces, a smaller quantity than she ordinarily passed when feeling well. The urine was never stained with blood, nor did it contain any foreign matter that attracted any attention. During these two years she lost considerably in weight and became very pale and thin. She was not as strong as before, although she continued her work as a saleswoman.

In the autumn of 1895 she first noticed a tumor in the right side about two inches in diameter, not tender to pressure, and of firm consistency, located just beneath the tender area above referred to. The tumor seemed to make traction on this tender area, and she says it "felt as hard as a stone." It was at first spherical, barely noticeable when erect, and apparent only when the patient assumed a recumbent posture. She could not feel or see it at first when sitting or standing. The tumor was not noticeable at all times, but in about ten or fifteen minutes, after she made some movement which would bring on an attack of pain she would notice the swelling, which would gradually enlarge.

From this time on, and during 1896, the tumor increased in size in all directions, but principally downward. By the end of the latter year the tumor extended from one inch below the costal arch in the mammary line about three inches downward. As the tumor increased in size the attacks became progressively less painful up to September, 1897. At that time the tumor extended from the costal arch to one or two inches above the crest of the ileum. She could now place her hand beneath the tumor and lift it up; she could also outline it all around except posteriorly.

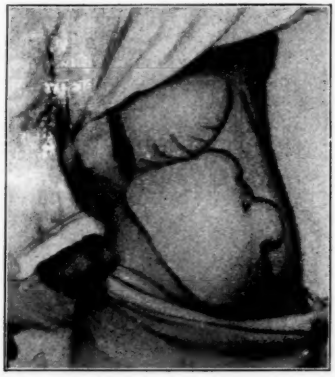
In 1897 she noticed that the tumor was constantly present, but varied greatly in size. She also observed that as time went on it required a longer time for the tumor to empty itself, and that it was more resistant. At such times it showed no tendency to decrease when she lay down, and it was necessary to use massage and pressure to bring this about. It usually required about three hours to accomplish this, and even then the contents of the tumor were not completely evacuated.

Throughout 1897, and until the present time, pressure upon the tumor causes her to have a desire to pass water, and she apparently evacuates

the bladder; and, if pressure is continued, she has another evacuation in from fifteen to forty-five minutes, this being repeated until the tumor becomes collapsed.

At this time the tumor extends from the costal arch to the brim of the pelvis and Poupart's ligament, and from the median line in front to the scapular line posteriorly. (Fig. 1.) These boundaries are constant. The tumor varies in consistency, is fluctuating, and feels soft.

FIG. 1.



Its contour is regular, and it is not tender to pressure. For two months preceding the examination it has not been painful except in the original area of tenderness, where there is an almost constant feeling of soreness.

The tumor causes her no discomfort excepting when it is much distended; at such times she notices abdominal distention and a feeling of weight in the middle of the tumor. So far as she knows, she has never passed blood or other foreign matter in the urine; but is said to have had intermittent slight albuminuria.

She feels well at present.

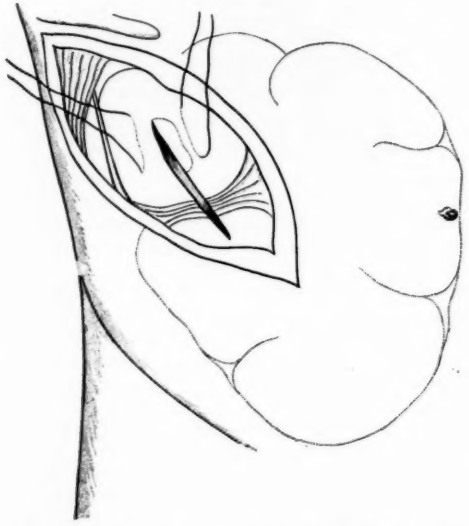
Operation: February 22, 1898, in the presence of the doctors from the Polyclinic, and assisted by Drs. Hessert, Buford, Waters, Doepfner, and Gillett, under ether narcosis I made cystoscopy with Kelly's instrument, the patient being in the knee-chest position. The bladder was normal; the left ureter could not be found; the right ureter was normal, and an elastic catheter was easily inserted 35 or 36 centitimetres. No urine escaped, and the catheter could not be passed higher. I thought that this probably meant a bend in the ureter close to and below the pelvis of the kidney, or, rather, the cystonephrotic sac. As I could see no urine dribbling down when the elastic catheter was in the ureter, into which it had passed easily, I was afraid that I might have made a mistake, and therefore reintroduced Kelly's tube that I might see the catheter in the ureter. I then saw that the catheter was in the ureter, but that there was some bleeding at the ureteral orifice.

The patient was now turned on the left side with a pillow under the

left hip. An oblique incision, 10 to 12 centimetres long, was made parallel to the twelfth rib from the erector spinæ. The latissimus dorsi was pulled aside or divided, and the quadratus lumborum divided. There was little perirenal fat. Respiratory movements could be observed through the transversalis fascia. The adipose capsule was a loose connective-tissue mass, containing little or no fat. It was so movable against the kidney that I took it to be the peritoneal cavity.

The surface of the kidney was globular and sacculated. It presented an elastic sac with a smooth, reddish or bluish-gray surface, resembling the color of kidney substance. In the wound a globular surface presented 5 or 6 centimetres in diameter. This was the top of the kidney located below the twelfth rib. It was consequently a floating kidney displaced downward. Below this surface was an annular depression corresponding to a partition wall of inter-pyramidal substance, and then a larger globular prominence below. Other less marked globular prominences corresponding to calyces were felt in the abdomen toward the median line. The sacs averaged 6 to 8 centimetres in diameter.

FIG. 2.



After packing sterile gauze around the borders of the sac the upper globular portion of the sac was fixed with two loops of heavy silk. (Fig. 2.) A perfectly limpid, clear, thin, transparent, light yellow fluid spurted from the stitch-holes. Dr. Brougham made cultures from this fluid.

I now incised the sac for a distance of 2 centimetres between the sutures. Hemorrhage followed the incision, which was so profuse that the yellowish, clear fluid became bloody. About a quart of the fluid was caught in a basin. The fluid was too transparent to contain any cells—that is, it was an aseptic cystonephrosis.

I now searched for the ureter inside of the sac. As the sac extended downward so as to fill the whole of the large pelvis the ureter was not sought for outside of the sac. In another case I might, however, do this after having found the ureter inside and passed a catheter down.

The incision was now prolonged downward for a distance of 6 or 8 centimetres. The wall of the sac was 3 millimetres thick. There was profuse hemorrhage from small vessels all over the wall, and from spurting arteries, especially at the location of the partition walls. I concluded that this vascularity was due to the presence of a good deal of secreting kidney substance. A small piece of this tissue was cut out for microscopical examination. The hemorrhage was stopped by Paquelin cautery, but the spurting arteries in the partition walls began to bleed again after the territory had been manipulated later on in the operation. This required the reapplication of the cautery three or four times in the course of the operation.

The inside of the cystonephrotic sac was sacculated; a narrow opening 1½ centimetres in diameter led into a sac 4 to 7 centimetres in diameter; the inner surface was smooth, shining, reddish-white, and looked like a smooth mucous or serous surface. After an hour multiple small ecchymoses changed the surface to a spotted red, not a dark blood-red, exactly as I have seen in a normal bladder after opening and manipulation.

The nearest presenting opening into a calyx was now pulled out of the incision in the sac by hooking a finger into the calyx, and the partition wall was divided on a flat director with a Paquelin cautery. The division was bloodless, close to the thin borders of the opening into the sac, but the outer part of the partition walls, where they were 2 or 3 millimetres thick, bled considerably, so that the divided arteries required repeated applications of the cautery.

I divided four partition walls to the extent of 2 or 3 centimetres, thus laying open four sacs. Three or four sacs had wide openings, and were not divided. During this consecutive division of the partition walls the entire cystonephrotic sac was drawn out and turned inside out. This and the manipulation during the division of the partition walls were accomplished by hooking the index-finger into a sac through an opening or around the free border of a septum, and at the same time pushing in the wall of the sac from the outer surface of the cystonephrotic sac.

In this manner I gradually exposed for inspection the whole inner surface, and finally laid open to view a cavity, the pelvis or the pelvic portion of the sac, on which I found the entrance to the ureter as a semilunar transverse fold 5 to 7 millimetres in diameter (Fig. 3), below which I could see a row of larger folds, transverse and located 1 centimetre apart. A probe could be passed easily down 2 centimetres into the ureter.

Examination of the ureter. A long metal sound was passed down 24 centimetres, as I supposed into the bladder, but in order to make sure I passed a steel sound into the bladder through the urethra. I could not feel the click, however, the sounds did not meet, nor could they be felt by Dr. Bacon's finger in the vagina. The sound in the bladder appeared to be separated from the probe in the ureter by a soft wall. As I thought the probe might be too short, I passed a long, flexible catheter down through the ureter, expecting to see it in the bladder through the Kelly speculum. I could feel the end of the flexible catheter from the vagina. I could feel it move, but the movement was not free, as it

would have been had it been in the bladder. It felt rather as if it was in the wall of the bladder, but was arrested in the portion of the ureter which passes through the wall of the bladder. I could feel no stone at the end of the catheter, and with the speculum I could not see the catheter in the bladder. The flexible catheter was now withdrawn; the attempt at withdrawal met with resistance, as if the catheter were caught low down in the ureter near or in the bladder wall.

FIG. 3.

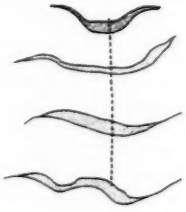


FIG. 4.

I now operated for the relief of the valve formation from the lateral implantation of the ureter in the pelvis. The pelvis was made tense by a finger of the left hand in the nearest calyx, and a flexible bougie passed down and into the ureter (see Fig. 4), which was then divided, together with the covering sac-wall, with scissors for a distance of 2 centimetres. The wall of the pelvis was grayish, 1 to 1½ millimetres thick, with loose connective tissue connected with the ureter, and consequently movable over it. The wall of the ureter was much thinner, probably ½ to ¾ of a millimetre thick. The wall of the divided ureter was united with the divided wall of the pelvis by a continuous catgut suture (Figs. 5 and 6).

A long, flexible catheter was passed down 24 centimetres or more, when it met with a soft resistance, and when withdrawn was held at this point by something which it pulled upon when the attempt at withdrawal was made. This resistance was overcome with a sudden jerk low down in the ureter, above which place the catheter moved easily. Dr. Buford noticed that the withdrawal of the catheter was followed by a welling up of blood from the ureter, but I am not sure that this blood had not run down from the bleeding surfaces in the cystonephrotic sac.

A bougie was now passed down 20 centimetres and left permanently in the ureter.

The everted cystonephrotic sac was inverted and replaced, after final stoppage of the hemorrhage from the partition walls with the Paquelin cautery.

The opening in the cystonephrotic sac was sutured to the skin by eight silk sutures.

After uniting the quadratus lumborum with a buried mattress-suture, a part of the posterior and anterior borders of the wound was united.

FIG. 5.

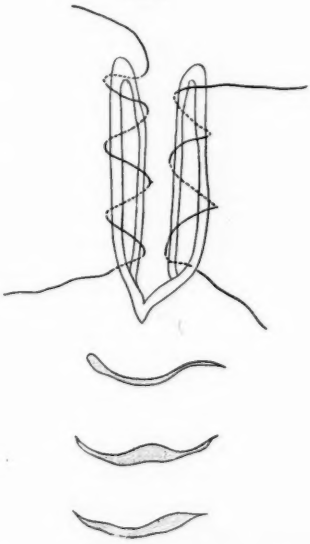


FIG. 6.

A large rubber drain was passed inside of the cystonephrotic sac down to the bottom, and the sac was loosely packed with sterile gauze around the drain. Gauze drains were packed around the outside of the sac between the latter and the abdominal wall.

The operation lasted two hours and a half; the loss of blood was slight. Toward the end of the operation the pulse became weaker, but not too frequent, 100 or below. Hypodermatic injections of camphorated oil and strychnine were made.

Examination of the fluid from the tumor. The tumor contained about 1200 cubic centimetres of fluid, which was limpid and transparent, distinctly acid, and had a specific gravity of 1013. It contained 36 grammes of solids, about one-half the normal amount; 4.8 grammes of urea, about one-fifth the normal amount; 7.8 grammes of chloride, one-half the normal amount. Phosphates, sugar, bile, and indican were absent, and sulphates present.

After-treatment. The first twenty-four hours after the operation the quantity of urine was much less than normal. This was followed by a

rapid increase, which on the third day exceeded the normal amount, and on the sixth day amounted to 149 ounces. During this rapidly increasing secretion of urine the patient was extremely nervous and slept very little, although for the first few days, when the urine was fairly normal, the nervousness was not so marked. During this period of polyuria the patient drank large quantities of water both day and night, the quantity corresponding fairly well with the amount excreted. The patient constantly complained of thirst, and especially of dryness in the throat; no especial symptoms referable to the kidney were observed, and the only inconvenience was the frequent desire to empty the bladder.

On the tenth day a solution of pyoktanin was injected into the kidney, the openings carefully closed, and the patient instructed to lie on the opposite side for one or two hours. The solution did not appear in the urine, however. A week later, before the daily irrigation, the patient passed seven and one-half ounces of urine of normal color. Immediately after the irrigation, twelve ounces of perfectly clear fluid was withdrawn from the bladder. Pyoktanin was again used two and four days after the first employment, but still with negative results. The increased quantity of urine passed was not in any way dependent upon the filling up of the bladder by the boric-acid solution used for irrigating the wound, as there was no appreciable difference noticed in the quantity of urine passed within the same period before and after the irrigation. The ureter was demonstrated to be open only once, on the seventeenth day, when the quantity of urine passed was about normal. As the restlessness and nervousness of the patient subsided the quantity of urine decreased, and the thirst and dryness of the throat gradually diminished.

The right kidney secreted from three to eleven ounces in the twenty-four hours, which was estimated by weighing the dressings when applied and when removed, the difference in weight of the dressings representing the amount of uirne excreted.

The outcome of this case is not material, as the object of this report is only to show the feasibility of this method of operating.

PULMONARY TUBERCULOSIS WITH INTERCURRENT TYPHOID FEVER COMPLICATED BY PNEUMONIA—TRIPLE INFECTION.

By Augustus A. Eshner, M.D.,
of Philadelphia.
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The following case, though but an isolated one, would seem to be worthy of record by reason of the rarity of the combination of conditions it illustrates. Simultaneous triple infection is not common, although I have recently reported a case in which typhoid fever, pul-

monary tuberculosis, and syphilis coexisted,[1] at the same time making brief reference to the case now detailed at length:

An unmarried colored woman, aged twenty-eight years, who had been employed as a domestic, was admitted to the Philadelphia Hospital on August 13, 1898, with a temperature of 102° F., a pulse of 102, and respirations of 28, complaining of dizziness, deafness, swelling of the throat, and soreness of the chest. The abdomen was distended, the tongue was coated, and the breath was offensive. The woman had felt ill for three days, with malaise, anorexia, feverishness, and looseness of the bowels. There had been no epistaxis and no abdominal tenderness. The patient appeared well nourished. The tongue was dry and coated; the pulse rapid and irregular, but of good volume and tension. There was some mental dulness, but no physical abnormity was detected. There was nothing noteworthy in the previous history, but a sister of the patient had died of pulmonary tuberculosis, a brother of coxalgia, and another of spinal meningitis.

For the reduction of the temperature, which had risen to 104° F., the patient was sponged with ice-water and alcohol for twenty minutes on the 13th, an ice-bag being kept applied to the head constantly; but this having no appreciable effect, cold packs were employed on the 14th, at intervals of three hours, to the number of ten in the course of twenty-seven hours. These also were without marked effect. On the 15th a positive report was received as to the Widal test, and after three plunge-baths at this time the temperature fell below 102° F., and rose above this level only on the following day, to drop again in the sequence of a further bath, after which it gradually declined, reaching normal on the 21st, after nine days in the hospital.

During the illness there had been slight cough, some muttering delirium, and some tremulousness of speech, although the patient had slept fairly well. The highest temperature recorded was 104.6° F., the highest pulse 120, and the highest respirations 36. The patient appeared to enter upon convalescence, although the temperature ran a little above the normal, though never higher than 100° F., until September 7th, when it rose to 101° F. There was now complaint of headache, and there had been on several occasions nausea after taking food. By the 11th the temperature had risen to 102.4° F. and the respirations to 40, while the pulse did not exceed 116. The patient now complained of severe pain in the right side of the chest, referred to the region of the nipple and the angle of the scapula and synchronous with inspiration. Respiration was labored, the nasal alæ dilating on inspiration, and there was some delirium. On physical examination the pulmonary expansion was found deficient on the right side of the chest, with impairment of the percussion-resonance, subcrepitant râles on auscultation, and relatively increased vocal resonance and tactile fremitus. The withdrawal of five ounces of blood from the right side of the chest by means of wet cups afforded immediate relief from pain, and the patient was made quite comfortable in this respect. On the 14th the impairment of percussion-resonance had given place to dulness, the roughness of breathing had increased, and the subcrepitant were replaced by crepitant râles. The cough was short and painful and productive of but scanty expecto-

[1] Philadelphia Medical Journal, March 25, 1899, p. 679.

ration. The respirations were rapid, reaching 40, and the pulse weak and thready, reaching 124. The temperature rose to 102.2° F. The urine contained a small amount of albumin and hyaline and granular tube-casts. On the 20th the temperature appeared to be falling by lysis. On the 22d the patient was expectorating small amounts of tenacious, blood-streaked sputum, in which pneumococci were found, but no tubercle bacilli. On the 24th the temperature reached normal, and so continued. The physical signs of pulmonary consolidation indicated only tardy clearing up, and the patient continued to be much troubled with nausea and vomiting; nor did she seem able to acquire strength. On the 27th the patient, quite unexpectedly, was noticed to grasp for breath. The pulse shortly became imperceptible, and death had taken place within thirty minutes.

Upon post-mortem examination the left pleura was found adherent at the apex of the cavity, while on the right side firm adhesions were present anteriorly, posteriorly, and at the base. The pericardium contained about 5 c.cm. of blood-tinged fluid, and a few milk-spots were present on the posterior aspect of the visceral layer. The heart was covered with a thin layer of subpericardial fat. The myocardium was on section flabby and friable, pale brown in color, and granular in appearance. Here and there were areas, light yellow in color, probably of a fatty nature. The right side of the heart was greatly dilated and the muscular wall was quite thin. The tricuspid orifice easily admitted three fingers. The remaining valves and orifices presented no abnormality. The left lung was crepitant and emphysematous at its margins. Upon section serum exuded and a number of tubercles came into view at the apex, some caseous and some purulent. The right lung was quite firm throughout, especially at the base. Upon section the knife encountered distinct resistance, and the organ was found consolidated from apex to the base. At the apex the lung had a nodular feeling, while at the base it was uniformly solid. The cut surface was brownish in color, and in places pus exuded. Bits removed sank in water. The spleen presented a smooth surface; its pulp was soft and friable. The kidneys were pale, reddish-yellow on section, with the cortex increased greatly and of a fatty appearance; the structure of the organs was soft and friable. The surface of the liver was smooth, its edges rounded, its substance friable, its divided surface light red in color, and of granular appearance. The small intestine contained the remains of old ulcers, apparently healed.

This case presents several considerations of interest. In the first place it is characterized by the concurrence of three distinct infectious processes—tuberculosis, typhoid fever, and croupous pneumonia. There is no obvious and inherent reason why such an association should not take place, but as a matter of fact it is not common. In this case I should consider it coincidental and accidental, and not indicative of any more intimate inter-relationship. It is true that certain diseases seem to predispose to the development of certain other diseases, but any such relation would hardly be contended for in the present instance. We are, on the other hand, without adequate evidence that the existence of one infectious disease is antagonistic to the development of any

other infectious disease. I should think that the tuberculosis was an ancient process, and probably the earliest of the three, because of its limitation to the apex and the caseous changes that had already begun to take place in it. No dependence, in this connection, can be placed upon the temperature, which declined almost to the normal when the attack of typhoid fever had come to an end, and actually to the normal while the pneumonia was yet unresolved.

It has in the past been thought by some observers that an antagonism existed between typhoid fever and tuberculosis. Thus Murchison[1] quotes M'Forget as making the statement that persons suffering from pulmonary tuberculosis are rarely attacked by typhoid fever and as regarding the former as a preservative against the latter, although Murchison adds: "Whether this be so or not, an attack of enteric fever is often followed by tuberculous deposits in the lungs."

Osler[2] states that "typhoid fever occasionally occurs in persons the subject of pulmonary tuberculosis. In four cases of eighty autopsies in typhoid fever tuberculous lesions were present. There are cases on record also of acute miliary tuberculosis and typhoid fever present in the same subject. There is a wide-spread opinion that typhoid fever predisposes to tuberculosis, and Wilson Fox, in his treatise on *Diseases of the Lungs*, gives reference to a number of cases. In my experience it has been very rare. I have no recollection of an instance in which tuberculosis has developed either during convalescence or immediately after recovery from typhoid fever." Tuberculosis is not mentioned at all as a complication among 389 cases of typhoid fever reported by Osler.[3]

Although the association of the two diseases is perhaps not actually common, there is abundant evidence to remove all doubt as to its occurrence, and of the fact that typhoid fever may develop in a tuberculous subject, and tuberculosis in the course or sequence of an attack of typhoid fever, and either bowel or lung or both be involved in the tuberculous process. Among 2000 fatal cases of typhoid fever examined after death at Munich, Hölscher[4] noted 108 (5.4 per cent.) of tuberculosis in various situations, and he quotes Gruber[5] as having noted among 710 fatal cases of typhoid fever twenty-two (3.3 per cent.) complicated by old tuberculosis of the lungs. Bettke,[6] among 1420 cases of typhoid fever at Basle, noted twenty-three (1.6 per cent.) in tuberculous subjects; while Döpfer[7] noted tuberculosis in forty-six (5 per cent.) among 927 cases of typhoid fever.

[1] The Continued Fevers of Great Britain, third edition. London, 1884.
[2] Principles and Practice of Medicine, 1898, third edition, p. 315.
[3] Johns Hopkins Hospital Reports, vols. iv. and v.
[4] Münchener med. Wochenschrift, January 20 and 27, 1891.
[5] Dissertation: Ueber Complication von Typhus und Tuberculose, 1887.
[6] Deutsche Klinik, October 15 and November 26, 1870.
[7] Münchener med. Wochenschrift, September 11, 1888.

The pneumonia in the present instance was evidently a late complication. It was lobar in type, and, as microscopical examination of the sputum stained during life showed, of pneumococcous origin. Croupous pneumonia complicating typhoid fever occurs, as a rule, at the height of the attack or toward the close of the febrile period, rarely at the onset, and seldom during convalescence or in the course of a relapse. Lobar pneumonia is less common than lobular pneumonia. Thus among the 2000 fatal cases at Munich, Hölscher[1] noted 164 cases of lobular pneumonia (8.2 per cent.); 138 of croupous pneumonia (6.9 per cent.): and twelve of desquamative pneumonia (0.6 per cent.). Bettke,[2] among the 1420 cases at Basle, noted fifty-two of lobar pneumonia (3.6 per cent.), and lobular pneumonia in only fifteen cases (1 per cent.), although he adds the qualification that he did not venture the diagnosis of lobular pneumonia in cases in which recovery ensued, and he admits that he may thus have included some of these cases among the number of those of lobar pneumonia. Finally, Döpfer[3] noted among his 927 cases sixty-three of lobular pneumonia (6.8 per cent.); thirteen of hypostatic pneumonia (1.3 per cent.); two of desquamative pneumonia (0.2 per cent.); and fifty-five of croupous pneumonia (6 per cent.).

Among 229 cases of typhoid fever observed by Osler at the Johns Hopkins Hospital,[4] seven were complicated by pneumonia, and two of these terminated fatally. Among 160 additional cases,[5] pneumonia as a complication is not mentioned.

A. Fränkel[6] relates that among 500 cases of typhoid fever seen in the course of nine years he has observed six complicated by true fibrinous pneumona.

The lobular pneumonia complicating typhoid fever is due principally to the activity of pyogenic cocci, and especially streptococci and staphylococci, though it is believed that typhoid bacilli also may play a causative rôle. Croupous pneumonia complicating typhoid fever is dependent almost exclusively upon the activity of the pneumococcus of Fränkel-Weichselbaum, rarely upon that of the bacillus of Friedländer. In some cases the typhoid bacillus is responsible for the pneumonia, and then the complication is most likely to occur early. This form of pneumonia is said to be frequently unattended with a chill, to be marked by less rapid elevation of temperature, less pronounced infiltration, tardy recession, and an absence of the characteristic sputa.[7] It is only to cases of typhoid fever in which the complicating pneumonia is dependent upon the typhoid bacillus that the designation pneumo-typhoid or typhoid pneumonia can with propriety be applied.

[1] Op. cit. [2] Op. cit. [3] Op. cit.
[4] Johns Hopkins Hospital Reports, vol. iv., 1895. [5] Loc. cit., vol. v., 1895.
[6] Berliner klinische Wochenschrift, March 20, 1899, p. 266.
[7] Curschmann. Nothnagel's Specielle Pathologie u. Therapie, 3. Band, i. Theil.

A CASE OF MITRAL STENOSIS, WITH FEVER (NON-MALARIAL) OF RELAPSING TYPE.

By Frederick P. Henry,
of Philadelphia, Pa.

The title of this report is open to criticism, inasmuch as the fastigium of relapsing fever continues for a period of several days, whereas in the case I am about to discuss the acme of the fever was maintained for but a few hours. In employing the adjective relapsing I mean to imply a fever *recurring* at intervals of about one week, and, so far as I am aware, such a type of fever, in connection with endocarditis, has not been hitherto described. In a paper entitled "The Chronic Intermittent Fever of Endocarditis,"[1] Osler reviews the literature of the subject, mostly English, and finds one of the earliest references to it in Ormerod's Gulstonian Lectures, which were published in 1851. In this case there were two febrile paroxysms daily, and in all the reports with which I am acquainted the type of fever has been either quotidian, tertian, or, as in Ormerod's case, double quotidian. The rarity of the febrile type presented by my case has seemed to me sufficient warrant for its publication.

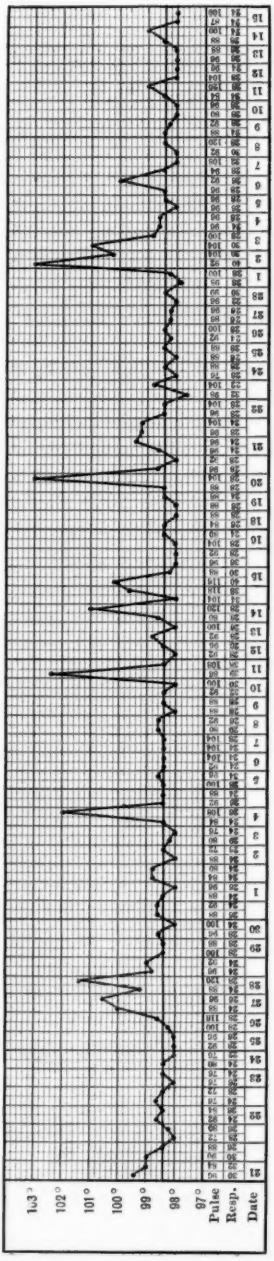
Margaret D., aged nineteen years, dressmaker, admitted January 21, 1899. Father living and well at the age of sixty-eight years; mother died at the age of thirty-two years of pneumonia. Has had four brothers and three sisters, of whom one brother and two sisters are living. The patient had typhoid fever three years ago; rheumatism in childhood; pneumonia a few months ago. She has lived in Philadelphia all her life.

Present Illness. About ten days before admission she began to feel weak and languid and disinclined to work, with headaches, pains in the back of the neck and back, and poor appetite. In addition there was anorexia, occasional nausea and vomiting, soreness in the abdomen, epistaxis, diminished excretion of urine, and cough. The menses have been suspended for two months. The patient is a fairly well nourished white female of average height. Her face is flushed, expression dull, eyes half closed, tongue lightly coated and tremulous; pulse 96, respirations 30, temperature on admission 99.2° F.

Physical examination revealed nothing abnormal except a typical presystolic murmur, low pitched, prolonged and rumbling, followed by short, sharp, first sound, the second sound being scarcely audible at the apex. The heart is but little if at all enlarged, the apex-beat being palpable in the fifth intercostal space within the mammary line.

On the day after admission the temperature became normal, and so continued until the 26th, five days later, when it began to rise. On the 28th, at 8 A.M., it reached 101.4° F.; on the 29th it was again normal, and remained so until February 4th (six days later), when it

[1] Practitioner, 1893, vol. l. p. 181.



suddenly rose at 8 A.M. to 102° F. Six days later, at 6 P.M., there was another ascent to 102.4° F. On the 20th it again rose at 8 A.M. to 103° F., slighter elevations having occurred on the 14th and 15th. On March 1st (at 8 A.M.) it again suddenly rose to 103° F., after which it continued normal.

The accompanying chart shows the character of the febrile movement much better than any verbal description. On two occasions the rise of temperature was accompanied with a chill, and in one with the vomiting of undigested food. Repeated examinations of the blood for the malarial organism gave negative results. The urine was free from albumin, sugar, and casts, and the liver was of normal size and apparently healthy in all respects. It is scarcely necessary to add that foci of suppuration were carefully excluded.

On March 25th the patient was examined in the clinic by my hospital colleague, Dr. Edward P. Davis, with special reference to the question of pregnancy. Dr. Davis concluded that the woman was pregnant.

The blood was examined on three occasions, the average of the three counts giving 2,705,000 red corpuscles per c.mm. and 20 per cent. of hæmoglobin. The leucocytes numbered 6000 per c.mm. A differential count of the latter was not made.

To recapitulate: The patient is a young, unmarried woman, pregnant, highly chlorotic, with well-marked though well-compensated mitral stenosis and fever, which may be styled recurrent, relapsing, or intermittent, but is certainly not malarial. The inference that the fever is dependent upon the heart lesion is based on the fact that no other cause for it could be found. This is the basis upon which rests the universally accepted opinion that the more regular types of intermittent fever and the continued fever associated with endocarditis are dependent upon the latter.

So far as I am aware, no theory has been advanced to explain the inter-

mittency of non-malarial fever, such as that attending hepatic disorders, tuberculosis, endocarditis, etc. In discusing these intermittent fevers it should, I think, be borne in mind that in health there is a diurnal variation of the temperature, and that, as I demonstrated in the Cartwright Essay for 1881, diurnal elevation is coincident with a diminution in the number of the red blood-corpuscles and an increased elimination of urinary pigment—in short, that it corresponds with hæmolysis. As first pointed out by William Hunter, the occasional elevations of temperature in pernicious anæmia are also hæmolytic, as evidenced by their coincidence with a deeper discoloration of the skin, an excessive elimination of pathological urobilin, and a still further diminution in the number of red corpuscles. The condition, in short, is an exaggeration, or, rather, a perversion of what obtains in health. The intermittency of the malarial fevers is also conincident with a parasitic invasion and destruction of the red corpuscles; and with these facts to guide us I would suggest the probability of solving the problem of non-malarial intermittency by a careful study of the blood.

It might be suggested that the fever of my patient was due to the impoverished state of the blood; in other words, that it was the same in kind as the so-called anæmic fever of pernicious anæmia. In reply to such a supposition I would call attention to the fact that the characters of the blood were those of chlorosis, the percentage of red cells being more than double that of the hæmoglobin, and that febrile chlorosis is rarely met with. According to Huchard also, fever, when it occurs in chlorosis, is continuous.[1] It might, with equal propriety, be argued that the anæmia is the result of the valvular affection, for, as is well known, in endocarditis, especially of the ulcerative form, the anæmia is often intense. I recall a case of ulcerative endocarditis which I saw with the late Dr. James H. Hutchinson in which the anæmia was so profound and the cardiac murmur (mitral systolic) so soft that the diagnosis for a time vacillated between pernicious anæmia and ulcerative endocarditis. At the autopsy the left auriculo-ventricular orifice was almost occluded with vegetations, and most of the viscera contained numerous emboli.

The fact that my patient is still living and at present free from fever is no argument in favor of the view that this symptom was not etiologically connected with the valvular disease, but was due to some undiscovered ephemeral cause. I have purposely refrained from using the term "malignant" as applied to endocarditis, because I know of no dividing line, either clinical or bacteriological, that can be drawn between malignant and benign forms of that disease. The view that an ulcerative endocarditis is necessarily fatal is also disputed by

[1] Sajous' Annual Univ. Med. Sciences, 1891, vol. ii.

Leyden,[1] who relates two cases of apparent recovery from that condition.

The sole criterion of malignancy in cases of endocarditis is their fatal termination after an acute febrile attack, which may be intermittent, continuous, or, as in the case just reported, recurrent or relapsing.

COMPARATIVE ACTION OF THE GREEN AND BROWN STROPHANTHUS SEEDS.

By Henry H. Rusby, M.D.,
PROFESSOR OF MATERIA MEDICA AT THE NEW YORK UNIVERSITY AND BELLEVUE HOSPITAL MEDICAL COLLEGE AND AT THE NEW YORK COLLEGE OF PHARMACY.

The Committee on Research of the American Medical Association in 1897 instituted a comparative investigation of the green and brown strophanthus seeds, work in the different departments being undertaken by different investigators. Dr. Franz Pfaff, of the Harvard Physiological Laboratory, undertook an investigation of their physiological action, which was carried out by his assistant, Dr. M. P. O. Vejux-Tyrode. The complete reports of these experiments are but now ready for publication, and are presented herewith.

Perfect specimens of the two seeds were carefully selected by myself and 5 per cent. tinctures of them prepared. These tinctures were marked "A" and "B," respectively, and were thus supplied to Dr. Pfaff without any further knowledge on his part of their identity. In the report entitled "First Report" these are referred to only as "A" and "B." Through an accident in transportation, the key to the application of these letters was lost, so that it was not certainly known which referred to the green and which to the brown seeds. Fresh lots of seeds were therefore selected, tinctures made as before, and the experiments repeated as detailed in the report entitled "Second Report." Dr. Tyrode recognized the tincture of the green seeds as corresponding to "A" in the first report, that of the brown to "B."

It will be seen that the results of these experiments prove the existence in strophanthus seeds of two distinct principles, one of which may be referred to as the "toxic principle," the other as the "cardiant principle." That they are distinct principles is clear, as the two seeds exhibit the two properties in opposite rather than in parallel degrees.

These two properties have not been definitely located in the different constituents. When this shall have been done it may enable us to devise preparations which will represent the one and eliminate the other.

[1] Ueber intermittirendes Fieber und Endocarditis. Zeitschrift für klin. Med., 1882, No. 4.

There can be little doubt remaining that the two plants yielding these seeds are specifically distinct—that is, the one is not a mere variety of the other.

Lastly, if the conclusion is correct that "A" represents the green and "B" the brown seeds, it follows that the green seeds, or those of S. Kombé Oliver, should alone be specified and described in the *Pharmacopœia*.

Comparison of two Solutions of Strophanthus.[1]

First Report. By Dr. Maurice P. O. Vejux-Tyrode.

Dr. H. H. Rusby, on behalf of the Committee on Research of the American Medical Association for 1897, has submitted for comparative examination two alcoholic solutions of different seeds of strophanthus, namely, the green and the brown, which were prepared in the same manner.

These two solutions (marked "A" and "B") are of a pale straw-color, the color of solution "A" being slightly deeper than that of solution "B." Both become opalescent when mixed with water.

As strophanthus is a heart poison, my efforts toward making a comparison were directed to the circulation, which was studied mainly by means of blood-pressure experiments.

The following series of experiments was performed upon rabbits, which were prepared for this purpose by being deprived of food for twenty-four hours. Before the experiments they were narcotized with seven decigrams of chloral per kilogram of body-weight. By means of a canula the carotid was connected with a mercury manometer, which recorded the blood-pressure upon the kymograph. The drug was introduced into the circulation by injection into the jugular vein. Curves were taken about every five minutes. The measurement of the pressure in the table of experiments is given for every quarter of an hour.

I performed fifteen experiments on blood-pressure; eight of these were done with solution "A," while the seven others were done with solution "B." Since the results of all these experiments do not materially differ, I shall cite but four instances. The first two were performed with solution "A," diluted ten times; the last two with solution "B," diluted in Experiment 3 ten times, and in the other experiment twenty times. It was found necessary to make this dilution so that the drug might not reach the heart in too concentrated a form, and also to avoid the irritating effect of the alcohol.

[1] The writer wishes to express his sincere thanks to Dr. Franz Pfaff, Instructor in Pharmacology at the Harvard Medical School, under whose direction this work was done, for many valuable suggestions and for kind and careful criticism.

EXPERIMENT I. With solution "A," diluted ten times. December 1, 1897. Rabbit weighed 198 grammes. At 10 A.M. received one grain of chloral in 50 c.c. aqua per os. Operation began at 12.10; operation finished at 12.45. Canulas in carotid artery and in jugular vein.

Time. P.M.	*Blood pressure in mm. of Hg.*	*Remarks.*
12.15—1.15	48	
1.15—1.30	50—64	1.20. Injected ⅓ c.c. dilute strophanthus.
1.30—1.45	70—76	1.45. Injected ⅓ c c. dilute strophanthus.
1.45—2.00	80—86	1.55. Injected ⅓ c.c. dilute strophanthus.
2.00—2.15	88	2.12. Injected ⅓ c.c. dilute strophanthus.
2.15—2.30	88—92	2.25. Injected ⅓ c.c. dilute strophanthus.
2.30—2.45	92	2.40. Injected ⅓ c.c. dilute strophanthus.
2.45—3.00	92	3.00. Pulse quite irregular.
3.00—3.15	88	3.05. Injected ⅓ c.c. dilute strophanthus. 3.6—3.20. Clot removed from carotid.
3.15—3.30	110	3.25—3.30. Another clot removed. Pulse curve continued irregular until death.
3.30—3.45		
3.45—4.7	104	4.7. Animal died.

EXPERIMENT II. With solution "A," diluted ten times. December 8, 1897. Rabbit weighed 2220 grammes. At 9.30 A.M. received 1.55 grammes of chloral in 50 c.c. aqua per os. Operation begun at 10; operation terminated at 10.30. Canulas in carotid artery and in jugular vein.

Time. A.M.	*Blood pressure in mm. of Hg.*	*Remarks.*
10.40—10.55	52—54	
10.55—11.10	52—54	11.5. Injected ⅓ c.c. dilute strophanthus.
11.10—11.25	54—60	11.16. Injected ⅓ c.c. dilute strophanthus. 11.24. Injected ⅓ c.c. dilute strophanthus.
11.25—11.40	62—66	
11.40—11.55	60	11 52. Injected ⅓ c.c. dilute strophanthus.
11.55—12.10	62—68	12.5. Injected ⅓ c.c. dilute strophanthus.
12.10—12.25	68—74	
12.25—12.40	.....	Clot removed from carotid.
12.40—12.55		
12.55— 1.10	56—60	1.2. Injected ⅓ c.c. dilute strophanthus.
1.10— 1.25	60—78	1.13. Injected ⅔ c.c. dilute strophanthus.
1.25— 1.40	82	
1.40— 1.55	80—84	1.41. Injected ⅓ c.c. dilute strophanthus.
1.55— 2.10	84—98	1.58. Injected ⅓ c.c. dilute strophanthus. 2.3—2.25. Pulse curve irregular.
2.10— 2.25	98—100	2.15. Clot removed from carotid.
2.25— 2.40	.....	2.35. Prepared other carotid.
2.40— 2.55	62—84	
2.55— 3.10	82—94	
3.10— 3.25	60—70	3.20. Injected ⅓ c.c. dilute strophanthus. 3.17—3.27. Quite regular beat, large pulse curve.
3.25— 3.38	72	3.34. Injected ⅓ c.c. dilute strophanthus. 3.38. Animal died.

EXPERIMENT III. With solution "B," diluted ten times. January 3, 1898. Rabbit weighed 1890 grammes. At 12 M. received 1.32 grammes of chloral in 50 c.c. aqua per os. Operation begun at 12.50; operation finished at 1.20. Canulas in carotid artery and in jugular vein.

Time. P.M.	*Blood pressure in mm. of Hg.*	*Remarks.*
1.55—2.10	48—72	
2.10—2.15	70—72	2.12. Injected 1/10 c.c. dilute strophanthus.
2.15—2.30	70	2.23. Injected 1/5 c.c. dilute strophanthus.
2.30—2.45	.....	Clot removed from carotid.
2.45—3.00	82—86	3.00. Injected 1/10 c.c. dilute strophanthus. Pulse curve irregular.
3.00—3.15	66—76	
3.15—3.30	78—86	3.25—3.30. Clot removed from carotid.
3.30—3.45	72	3.45. Injected 1/10 c.c. dilute strophanthus.
3.45—4.00	68	3.45—4.55. Pulse curve irregular.
4.00—4.15	58—62	
4.15—4.30	46	4.30. Injected 1/5 c.c. dilute strophanthus. Pulse curve very irregular.
4.30—4.55	46	4.50. Injected 1/10 c.c. dilute strophanthus. 4.55. Animal died.

EXPERIMENT IV. With solution "B," diluted twenty times. January 12, 1898. Rabbit weighed 1900 grammes. At 9.15 A.M. received 1.33 grains of chloral in 50 c.c. of aqua per os. Operation begun at 10; operation finished at 10.20. Canulas in carotid artery and in jugular vein.

Time. A.M.	*Blood pressure in mm. of Hg.*	*Remarks.*
10.25—10.40	76— 86	
10.40—11.00	76— 88	10.40. Injected 1/5 c.c. dilute strophanthus. 10.55. Injected 1/5 c.c. dilute strophanthus.
11.00—11.15	88— 98	11.8. Injected 1/5 c.c. dilute strophanthus.
11.15—11.30	90—100	11.30. Injected 1/5 c.c. dilute strophanthus.
11.30—11.45	86— 90	11.40. Injected 1/5 c.c. dilute strophanthus.
11.45—12.00	58— 86	11.52. Injected 2/5 c.c. dilute strophanthus. 11.55—1.00. Pulse curve quite irregular.
12.00—12.15	68— 84	
12.15—12.30	44— 70	12.25. Injected 1/5 c.c. dilute strophanthus.
12.30—12.45	60— 68	12.42. Injected 1/5 c.c. dilute strophanthus.
12.45— 1.00	66	1.00. Animal died.

RÉSUMÉ OF THE FOREGOING EXPERIMENTS

Number of experiments.	Average blood pressure in mm. of Hg before injection of stroph.	Average blood pressure in mm. of Hg from first injection of stroph. to the maximum rise.	Difference between the two in mm. of Hg.	Time between the two.	Amount of diluted drug injected.
Sol. A. I.	50.8	83.34	35.54	2 hrs. 15 min.	2.33 c.c.
" II.	51.6	67.8	16.2	3 " 10 "	4.00 "
Sol. B. III.	61.32	77.6	16.28	1 " 10 "	0.53 "
" IV.	77	87.2	10.2	0 " 35 "	1.00 "

While performing the blood-pressure experiments I noticed a marked difference in the degree of toxic properties between the two solutions. The quantity of drug which could be injected before the death of the animal seemed notably greater when solution "A" was used.

To determine the difference in toxicity between the two solutions, experiments were made upon frogs. The usual method of preparing the frogs for heart experiments was adopted. The drug was introduced into the dorsal lymph-sacs.

Below is a table showing the results of these experiments:

STROPHANTHUS A.

I. Frog weighed 45 grammes.

Time.	*Heart beat per min.*	*Remarks.*
5.12 P.M.	70	5.15. Injected 0.025 in 0.2 aq.
5.35	44	
5.50	18	
6.10	0	6.10. Heart stopped. Total injection 0.025

II. Frog weighed 35 grammes.

11.40 A.M.	52	12.5. Injected 0.01 in 0.2 aq.
12.10	48	12.15. Injected 0.005 in 0.1 aq.
12.35	27	
12.50	0	12.50. Heart stopped. Total injection 0.015.

III. Frog weighed 65 grammes.

2.20 P.M.	76	2.35. Injected 0.01 in 0.2 aq.
2.45	71	
3.15	59	3.32. Injected 0.005 in 0.1 aq.
3.45	48	
4.15	29	Heart very weak.
4.50	18	
5.12	0	Heart stopped. Total injection 0.015.

IV. Frog weighed 70 grammes.

		12.45. Injected 0.01 in 0.2 aq.
1.00 P.M.	60	
1.30	53	1.45. Injected 0.005 in 0.1 aq.
2.00	52	
2.30	44	2.40. Injected 0.005 in 0.1 aq.
3.5	27	
3.15	0	Heart stopped. Total injection 0.02 c.c.

V. Frog weighed 60 grammes.

4.20 P.M.	89	4.25. Injected 0.01 in 0.2. aq. After total injection 0.01 heart did not stop in two hours.
4.55	72	
5.25	58	
5.55	43	
6.28	48	Heart strong and regular. Experiment discontinued.

STROPHANTHUS B.

VI. Frog weighed 60 grammmes.

8.15 A.M.	82	8.25. Injected 0.005 in 0.1 aq.
8.45	69	8.45. Injected 0.0025 in 0.05 in aq.
9.15	72	
9.45	53	
10.15	20	10.5. Ventricle almost non-contractile.
10.35	0	Heart stopped. Total injection 0.0075.

VII. Frog weighed 60 grammes.

9.25 A.M.	82	9.28. Injected 0.005 in 0.1 aq.
9.45	78	
10.25	34	
10.50	44	11.15. Injected 0.0025 in 0.05 aq.
12.35	16	12.35. Injected 0.00125 in 0.025 aq.
12.55	0	Heart stopped. Total injection 0.00875.

Time.	*Heart beat per min.*	*Remarks.*
		VIII. Frog weighed 70 grammes.
3.00 P.M.	62	3.15. Injected 0.005 in 0.1 aq.
3.30	58	
4.00	52	
4.35	46	4.40. Injected 0.0025 in 0.05 aq. Marked peristalsis of heart.
5.00	42	
5.30	44	5.45. Injected 0.00125 in 0.025 aq.
6.00	40	6.35. Injected 0.00125 in 0.025 aq.
6.40	18	
7.5	0	Heart stopped. Total injection 0.01.
		IX. Frog weighed 60 grammes.
3.00 P.M.	74	3.15. Injected 0.005 in 0.1 aq.
3.30	64	
4.00	64	4.25. Injected 0.0025 in 0.5 aq.
4.30	64	
5.00	30	5.10. Injected 0.00125 in 0.025 aq.
5.30	32	5.45. Injected 0.00125 in 0.025 aq.
6.00	52	6.15. Injected 0.00125 in 0.025 aq.
6.30	34	
6.45	0	Heart stopped. Total injection 0.01125.
		X. Frog weighed 50 grammes.
9.25 A.M.	76	9.30. Injected 0.0075 in 0.15 aq.
10.00	60	
10.30	30	11.00. Marked peristalsis of heart.
11.00	58	11.8. Injected 0.00125 in 0.025 aq.
11.25	54	Heart irregular and intermittent.
12.00	48	
12.30	0	12.30. Heart stopped. Total injection 0.00875,
		XI. Frog weighed 55 grammes.
9.20 A.M.	60	9.30. Injected 0.0075 in 0.15 aq.
10.00	68	
10.35	50	
11.00	36	
11.35	8	
12.00	0	Heart stopped. Total injection 0.0075.

In the four typical experiments on blood-pressure (see Experiments I., II., III., IV.) one can see that the highest blood-pressure after the injections of solution "B" is about one-half as great as the maximum blood-pressure obtained with solution "A."

Naturally, with the same solution there is a certain range of variation in the height of the blood-pressure for different animals.

If we take an average of the height of the blood-pressure in the experiments with solution "A" and solution "B" we find that with solution "A" the average is about twice as great as that with solution "B."

As regards the difference in toxic power, the few experiments upon frogs show that with solution "A" the heart was stopped after a minimum toxic dose of 0.015 c.c. and a maximum dose of 0.025 c.c. The minimum toxic dose of solution "B" is 0.0075 c.c., while the maximum is 0.01125 c.c.

I conclude from the experiments done that both solutions are active

in raising the blood-pressure, and in toxic doses cause the frog's heart to stop; that solution "B" is twice as toxic as solution "A"; that solution "A," although it requires a little more of the drug, gives a longer, higher, and more constant rise of blood-pressure.

Second Report. No. 1 Experiment with Green Seeds. December 6, 1898.

Rabbit weighed 2090 grammes. Narcotized with 0.7 grammes of chloral hydrate per kilo weight. Canula in carotid and in jugular.

Time.	*Blood pressure in mm. of Hg.*	*Remarks.*
9.55—10.5	76—70	
10.5 —10.15	82—80	10.5. Injected 1/3 c.c. (tinct. stroph. diluted ten times).
10.15—10.30	76	10.25. Cleaned out carotid. 10.32. Injected 1/3 c.c.
10.30—10.55	76—86	10.40. Prepared other carotid.
10.55—11.5	76—86	10 55. Injected rest of 1st c.c. 11.7. Injected 1/3 2d c.c.
11. 5—11.15	80	11.15. Injected 1/3 2d c.c.
11.15—11.30	84—92	
11.30—11.45	78—86	11.35. Injected rest of 2d c.c.
11.45—12.00	82	11.55. Injected 1/2 3d c.c.
12.00—12.15	82—84	12.15. Injected 1/4 3d c.c.
12.15—12.30	84—92	
12.30—12.45	92—112	12.30. Injected rest of 3d c.c.
12.45— 1.00	60—68	12.45. Injected 1/4 4th c.c.
1.00— 1.15	60—82	
1.15— 1.30	96—170	
1.35	102	1.35. Killed the animal.

No. 2 Experiment with Brown Seeds. December 8, 1898.

Rabbit weighed 2130 grammes. Narcotized with 0.7 grammes of chloral hydrate per kilo weight. Canula in carotid and in jugular.

Time.	*Blood pressure in mm. of Hg.*	*Remarks.*
12.5 —12.25	88—102	
12.25—12.55	104—110	12.27. Injected 1/3 c.c. (tinct. stroph. diluted ten times).
12.55— 1.15	118—128	12 35. Injected 1/3 1st c.c.
1.15— 1.30	86—128	12.50. Injected 1/4 1st c.c. 1.20. Injected 1/3 2d c.c.
1.30 — 1.45	86—114	
1.45— 2.00	84	1.55. Injected 1/3 2d c.c.
2 00— 2.15	74—84	
2.30— 2.40	70	2.50. Animal died.

CRITICAL SUMMARY OF LITERATURE

ON

TUBERCULOSIS OF THE WALLS OF THE BLOODVESSELS AND THE PRODUCTION OF MILIARY TUBERCULOSIS.[1]

By Harvey R. Gaylord, M.D.,
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The younger men of this generation can have but an inadequate appreciation of the difficulties which were overcome by those pioneers to whose work we to-day owe our clear and satisfactory understanding of the mechanism involved in the production of miliary tuberculosis. The reason why the problem was one of such difficulty was owing to the fact that through the teachings of Rokitansky and Virchow the walls of the bloodvessels were supposed to be immune to tuberculous infection. Besides this difficulty it must be remembered that in those days, in which the very dawn of knowledge regarding tuberculosis had begun to break, the so-called caseous inflammation and caseous hyperplasia were not considered to have the most remote relation to tuberculosis. The first ray of light upon the subject came when Buehl and Dietrich propounded the doctrine that tuberculosis was produced by infection from without, and that this infection or poison, being carried into the bloodvessels, produced the miliary and subacute dissemination of the process. They further made the observation that in every case of general miliary tuberculosis somewhere in the body an older focus of caseous degeneration was to be found. Investigation following upon the Buehl-Dietrich doctrine did not confirm in full this observation, for in many cases it was impossible for the pathologist to locate the primary focus of the infection. Owing to the then current doctrine of Rokitansky, that the bloodvessels themselves were never the seat of infection, pathologists paid but slight attention to this field. True, Sir Astley Cooper had described in 1798 the existence of tuberculous infection of the ductus thoracicus. But this had been forgotten, and was only recalled, when nearly one hundred years afterward, Ponfic, at the Munich Natural Science convention of 1877, described his observations of cases of a similar nature. Ponfic saw no connection between the tuberculous infection of the thoracic duct and the accompanying miliary tuberculosis, believing, in fact, that the infection of the thoracic duct was secondary.

[1] Part of an address delivered at the quarterly meeting of the Buffalo Academy of Medicine, March 21, 1899.

In the same year Weigert observed the first lesion of the vena anonyma produced by the caseation of a lymph-node and the extension of the process through the vessel wall. He describes most vividly his astonishment on making this observation, and tells how for the first time he believed that he had found the true source of the miliary infection. His hopes were, however, doomed to temporary disappointment, for in the months following his first observation he was unable to find a second similar lesion. It was only a year later when, as he says, he had become emancipated from the doctrine of Buehl and Dietrich, that in every case of miliary tuberculosis a much older focus of caseation must be present; that in August, 1878, he found on the 21st and again on the 22d of that month, in two cases of general miliary tuberculosis, primary vascular lesions[1] of the pulmonary veins. These lesions were plainly visible to the naked eye, and in his original publication have been the subject of the most minute description. When we realize that in those days the tubercle bacillus was unknown, it is remarkable with what acumen and philosophical reasoning he drew his deductions. From this time the number of cases in which he was able to locate the primary vascular lesion became so numerous that in 1882 he pronounced the following rules by which the primary lesion of the vessel in miliary tuberculosis could be determined. He said: "When a tubercular lesion of a vein or other bloodvessel is the source from which the mass of bacilli which have produced the miliary tuberculosis have sprung it must fulfil the following conditions:"

1. The primary lesion must by its appearance and structure (caseation, size, etc.) prove to be of greater age than the miliary nodules.

2. The tuberculous focus must, when not located in the heart substance, occupy a portion of the wall of a vein or larger lymph-channel which is patulous—that is, not obliterated.

3. The eruption of miliary tubercles must be of such a character as to be only explainable by the theory that a large amount of tuberculous poison has entered the blood at once, and that, in other words, their development has occurred in a relatively short space of time.

4. The tuberculous poison must actually extend to the surface of the focus—that is, it must communicate with the lumen of the vessel. In the ductus thoracicus, where the nodules are placed upon the free surface of the vessel lumen, this is always the case. In the compact foci of the veins, for instance the pulmonary veins, at least a portion of the focus must be softened or caseated.

5. The venous tubercle must not be located in the portal system, otherwise the tuberculous poison would all be deposited in the liver.

[1] In this article the term primary lesion refers to the primary vascular lesion, *i. e.*, the inciting lesion of the miliary infection.

We see that when these postulates[1] were made the term as well as the fact tubercle bacillus was unknown, and it is with pardonable pride that Weigert reminds us that in his succeeding arbeit he was able to say, "It is only necessary to substitute the word tubercle bacillus for tuberculous poison." Following these publications of Weigert came a series of observations, all of which confirm his original findings. Of special interest we note that in the dissertation of Brasch, 1889, one of his students, an explanation of the manner in which the tuberculous infection of the ductus thoracicus is elaborately set forth. Here the infection is supposed to occur through the lymph-space by direct absorption from the pleural surface, or from the peritoneal surface, and is rendered possible by the absence of lymph-nodes from the course of the lymph-vessels. Although tuberculosis of the pleura and peritoneum are common, it does not necessarily follow that a tuberculous infection of the ductus thoracicus follows, many reasons for which may be enumerated. Of these, those tabulated by Wild seem to possess significance. The surfaces of the serous membranes are not as pervious to organisms as one might suppose; in fact, the membranes appear to possess a distinct ability to filter out the bacteria. This very probably occurs in tuberculous pleurisy, where masses of bacilli can be found upon the surface of the continuous epithelial covering of the membrane, the accumulations being especially great in the folds of the membrane. Where the direct transport does occur the tendency of the bacillus is to produce an obliterating process in the lymph-vessels, so that its progress when not sufficiently rapid would be impeded if not prevented. For this reason the explanation offered by Brasch of the mechanism of the production of miliary tuberculosis following tapping of the pleural cavity in tuberculous exudation appears distinctly rational. The sudden change in intrapleural pressure would naturally cause a distinct disturbance in the communicating lymph-spaces of the pleura, and it is entirely feasible to conceive that such sudden change might result in the establishment of a current toward the ductus thoracicus and the transportation of numbers of bacilli into that vessel. Baumgarten has gone even farther than Weigert, and believes that the bacilli can pass the lymph-nodes, especially when, after their lodgement in the lymph-node, they have proliferated. Hanau has, however, refused to accept this hypothesis. By all means the most common location for the primary focus in miliary tuberculosis is in the pulmonary veins. Here it was that Weigert first met with success, and it is in the pulmonary veins that by far the greatest number of lesions are observed. Weigert's first observations were naturally made without knowledge of the tubercle bacillus, and it was only

[1] The accuracy of the fifth postulate of Weigert is correctly questioned by Wild, who observes that there is no reason for considering the liver to be a bacterium-proof filter; and as Weigert makes no reference to Wild's criticism, it is probable that he no longer holds to this theory.

after its discovery, in fact during the last few years, that careful investigation of the primary vascular lesions has led some observers to question whether or not it is possible to accept in full his deductions. As a result of these investigations, apparent discrepancies in the solidity of the doctrine have been brought to light, and it is with these and the discussion which they have provoked that we shall deal, although somewhat shortly, this evening. The principle apparent objection which has been quoted against the observations of Weigert is that the percentage of cases in which the lesion has been positively identified is too low. Wild, a student of Ribarts, in a dissertation upon the subject, claims that the statistics of all these cases so far published show, when viewed from the minimum stand-point, but 50 per cent. of positive results. Weigert states, in a succeeding reference to Wild's publication, that in all his cases he now has a record of 70.8 per cent. The balance, he says, may be readily explained by the difficulty surrounding the determination of a lesion in the vessel walls, which may be minute and, by the inaccessibility and the impossibility of dissecting the entire circulatory system, escape notice. He says that when Wild believes this percentage to be too small he has no idea of the difficulties which surround the detection of the primary focus. In view of this statement of Wild's I take satisfaction in stating to you to-night that my former chief, Dr. George Schmorl, Prosector of the Staatkrankenhaus in Dresden, and who has at his disposal one of the richest materials in Europe, from 1200 to 1500 autopsies per annum, has authorized me to state that the percentage of cases of miliary tuberculosis in which he has positively located the primary lesion, of which he has had more than one hundred, is above 95 per cent. When one has seen the wonderful dexterity by which it is possible for a competent observer to detect these lesions he may readily understand that in the hands of less careful observers the percentage could readily be below 50. The second exception which Wild takes to Weigert's doctrine is that the number of bacilli found in the primary foci are seldom sufficient to account for the millions of tubercles with which the body is permeated in well-developed miliary tuberculosis; that in many of the lesions described in the literature the organisms were not located on or near the surface, and in consequence they could not have come in contact with the blood current. It is true, and this Weigert especially notes even in his earlier publications, that in many cases but few tubercle bacilli are present; but he says, with much justice, that from his stand-point it was a matter of secondary importance to determine how many bacilli were present in the lesion at the time of the discovery, for the reason that from this it would be entirely impossible to determine how many bacilli were present in the lesion before the moment when they were swept into the blood stream and produced the miliary tuberculosis. Secondly, he states the well-

known fact that carbol-fuchsin does not stain all of the bacilli in the tissue. It is well to add that a section through such a focus is no criterion of the number of bacilli which are present in the lesion. In his earlier publications Weigert sought to explain this apparent discrepancy by the assumption that the foci might contain innumerable spores of the tubercle bacillus. As we to-day know nothing of the existence of the so-called tubercle spore, Weigert has voluntarily withdrawn this explanation. A third statement which he makes is that in many cases, without doubt, the lesion which was found and described was not the primary vascular lesion, but that the observer, having found a tubercle of the vessel wall, rested satisfied, and thus overlooked the primary tubercular erosion. As to the solidity of Wild's criticism, it is pleasing to be able to add a trifling personal observation. I have seen at least a dozen cases where the primary erosion could be demonstrated, and have made from the surface of each erosion cover-slip preparations by taking up a small amount of fluid or softened exudate material with a platinum needle, and spreading and staining it after the usual methods. In such cases I have invariably found the field massed with tubercle bacilli, whereas in cut sections of such lesions the number of bacilli found was small. I think this observation rather indicates that Weigert's supposition that large numbers of bacteria had been previously swept away, as indicated by the fact that the surface of the lesion is distinctly richer in micro-organisms than the deeper portions, is correct.[1] In the ductus thoracicus it not infrequently occurs that the thrombi which are formed contain innumerable masses of the organism, and I have placed under the microscope a section taken from a case of Dr. Schmorl's, in which you may see that in this case it requires no effort of imagination to comprehend the method of the production of the miliary tubercles. Wild has quoted these facts in order to weaken the statement made by Weigert that miliary tuberculosis always springs from a lesion of a vessel, and that the tubercle bacilli must have been present in the lesion in sufficient numbers to have accounted for the miliary eruption. He assumes to supply this deficiency by the hypothesis that, although miliary tuberculosis in many cases follows tubercular erosion of the vessels, in such cases the bacilli need not have been carried into the blood stream in sufficient quantity to produce the miliary infection, but assumes they may proliferate in the blood to sufficient numbers to account for the innumerable miliary foci. To strengthen this argument he quotes the work of Wissekowitz upon the injection of organisms into the circulation of animals. Wissekowitz found that non-pathogenic organisms injected into the blood stream of animals were carried to the lymph-

[1] The form of vascular lesions to which this deduction especially applies usually shows excavations of their surfaces marking the site of previous caseous material which has been carried away. Large numbers of bacilli in the floors of such excavations rather indicate that the disintegrated caseous mass was rich in organisms.

nodes and larger glandular organs, there deposited, and ultimately perished. The pathogenic organisms, he found, followed the same course; but instead of perishing they proliferated in the organs and later reappeared in the circulation, steadily increasing until the death of the animal. Wild believes that such a mechanism may well be supposed to belong to the production of miliary tuberculosis, and that we need not look to primary foci for the supply of sufficient numbers of the bacilli to account for the innumerable tubercles. He adds that the miliary tubercles are not always of the same size and character, and that the process may extend over a somewhat protracted period of time; in fact, may run a course as long as eight weeks before the death of the patient. Furthermore, Wild calls attention to the fact that another condition beside the passage of tubercle bacilli into the blood stream must be fulfilled before a miliary tuberculosis results. He states that it is possible for bacilli to not only be carried with the blood stream, but be deposited in organs, and there produce no active change, as witnessed by the observations of Jani, who found in the testes of healthy individuals tubercle bacilli lying in the tissue, and there producing no apparent reaction. Wild reasons from this that there must be a disposition on the part of the patient to tuberculous infection before it is possible for the bacilli, even after entering the blood current, to produce the miliary infection. He states that Orth explained this apparent discrepancy in the activity or non-activity of the organisms on the theory of virulence of the micro-organism, and concludes his argument by quoting the observation of Koch and others, who have found in lymph-nodes, in direct contact with the lymph stream, especially in the perivascular lymph-spaces, enormous accumulations of tubercle bacilli, which had every appearance of being the product of proliferation. He assumes thereupon that it is impossible to explain the production of miliary tuberculosis in all cases by the rupture of a tuberculous focus into the blood stream. First, because in a large percentage of cases they are not found, and in these cases he would assume that the bacilli had been absorbed through the pulmonary capillaries or other portions of the capillary system; that although in small number they have been carried into the organs and lymph-nodes, where they have proliferated, and thence, re-entering the circulation, have produced the miliary infection. Second, it is not necessary that the primary focus should show evidence of the entry of large numbers of bacilli into the bloodvessels, as it is possible for the bacilli to proliferate in the bloodvessels or in the larger organs until of sufficient number, and by this means produce miliary eruption. Weigert answers these criticisms, as I have already stated, by quoting that the percentage of cases in which the lesion is not found is relatively small compared with the difficulties which surround their detection. And I have told you to-night of the

remarkable percentage which Schmorl has attained by the exercise of great manual dexterity. He says further that a miliary tuberculosis which requires eight weeks for its development is no longer a miliary tuberculosis, and in the cases which occur in which the whole process lasts but a day or two it is impossible to conceive of an explanation other than that the bacilli have been swept into the circulation at one time. He makes the statement that Wild has overlooked the fact that Orth had withdrawn his theory that special virulence of the tubercle bacillus was necessary in the production of miliary tuberculosis, and that Orth, in the last edition of his text-book, had indorsed Weigert's doctrine. He likewise states that a primary rupture of tuberculous material into the vessels has never been found without an accompanying miliary tuberculosis, and, likewise, tubercular infection of the ductus thoracicus has never been observed independent of a general miliary infection. He takes exception to the application of the argument of Wissekowitz, and reminds us that bacteriological investigations show that the tubercle bacillus does not find an especially favorable medium in the blood, and that the supposition that the organism proliferated enormously in this medium is entirely without experimental support.

There still remain forms of miliary tuberculosis, especially those following operation upon older tubercular foci, which may be said to have a form of traumatic origin. Bergmann qualifies such occurrences by stating that they may not in justice be said to have taken place except when, first, general symptoms of depression and the disease occur in the patient directly after the operation. Secondly, when the clinical symptoms and anatomical findings coincide, and, thirdly, when no other possible primary focus may be found. We see from the limitations which Bergmann has placed upon the traumatic form of miliary tuberculosis that their occurrence must be exceedingly rare, and that even then there is nothing about the mechanism of their production, if such occur, that in any way interferes with the complete acceptance of the doctrine of Weigert. Again, Wild quotes the miliary tuberculoses occurring after injection with Koch's tuberculin of patients suffering from advanced chronic tuberculosis. This phenomenon Virchow has explained as due to the breaking down of caseous foci resulting from the specific action of tuberculin. It does not exclude the possibility of the presence of one or more lesions of the vessels, which, through rapid disintegration induced by the tuberculin, could produce the infection of the blood current.

I think, in closing this short review of the controversy, that we may in fairness state that the explanation offered by Weigert for the apparent discrepancies in his own doctrine, as well as the statistics of others, indicate that we are perfectly safe in accepting postulates one to four of his doctrine, and that he has successfully met the criticism of both Wild and Ribart.

REVIEWS.

THE MINERAL WATERS AND HEALTH RESORTS OF EUROPE. By HERMANN WEBER, M.D., F.R.C.P., and PARKES WEBER, M.D., F.R.C.P., etc. 8vo., pp. 524. London: Smith, Elder & Co., 1898.

THE authors of this work have rendered great service to medical literature. Hermann Weber, the father of the junior author, is now in his seventy-sixth year, and although born and educated in Germany, has long been a resident of London, and for over forty years has been prominently identified with the Royal College of Physicians. At the outset of the present year Her Majesty Queen Victoria conferred upon him the honor of knighthood. Sir Hermann Weber is therefore now in that choice list of British subjects whom the Queen delighted to honor. The son, F. Parkes Weber, bears an honored name, and upon him, no doubt, has fallen in a large measure the burden of this very complete volume. The present publication is a revised and enlarged edition of the *Spas and Mineral Waters of Europe*. We scarcely realize in America to what an enormous extent hydrotherapeutics is employed in European countries. With the exception of a few fashionable resorts and perhaps a dozen mineral waters that have been successfully introduced in this country, the very names are unfamiliar. The authors have gathered from every corner of Europe information as to waters and watering-places; what they are and for what purposes useful; how to reach them and what resident physicians may be employed—in fact, everything relating to mineral-water resorts, climatic and hydrotherapeutic treatment, diet, exercise, and general regimen.

Speaking of the necessity for some knowledge of the character and qualities of the local medical men, the authors well say that success depends not only on an "intimate knowledge of the disease and the constitution, but on a certain sympathy, in the wider sense of the word, which arises from an insight into the mental condition and character of the patient, and which enables the doctor to put himself into accord with him and express his advice in such a way that it induces the patient to follow it. It is therefore necessary to find, if possible, a doctor at the spa who is conscientious, intelligent, sympathetic, and firm. Shakespeare would have been the greatest physician, and among recent doctors Sir William Gull owed his greatest success to such qualities."

The resident physician at a health resort doubly needs them, for, as a rule, he meets his patient in the sick-room for the first time. The idiosyncrasies of the invalid, the long history of illness, must be met by peculiar qualities in the attendant; therefore, a guide, such as this work, enters into details as to persons and places that must afford great satisfaction to both the patient and his physician.

The waters are classified as simple; muriated or common salt waters; simple alkaline waters; muriated alkaline waters; sulphated alkaline waters; sulphated and muriated sulphated waters; iron, arsenical, sul-

phur, and calcareous waters, etc. There is also a chapter on grape cures, milk and whey cures, and sanatoria for the treatment of phthisis.

Appended is a valuable and extensive bibliography, in which only two American names appear—those of Trudeau and Solly. Solly's work on climatology contains a valuable chapter on European resorts, and presents the American resorts in a manner which compares very favorably with the work of the Webers on Europe.

Americans do not visit American mineral springs as much as they did fifty years ago, when we take into consideration the growth of the nation. The summer exodus is to the seaboard, and resorts like Saratoga and the famous White Sulphur Springs have seen the day of their pre-eminence. On the other hand, people nowadays drink their mineral waters at home, and the consumption of domestic and imported medicinal and table waters is enormous, and is steadily on the increase. Our present consumption of domestic waters now amounts to about twenty-five million gallons, valued at nearly five million dollars. We use three million gallons of imported mineral waters each year.

The authors consider special diseases in the closing chapters, and are conservative as regards the result of treatment. For example, they say: "Syphilis is only to a very limited degree amenable to balneo-therapeutic treatment; ordinary methods of treatment are required. The idea that hot sulphur or other thermal waters can cure it is without foundation." Regarding diabetes mellitus, they speak of the waters of Vichy, Neuenahr, and Carlsbad, and add: "Their application, however, is limited. No complete and permanent cure of established diabetes is known to us for spa treatment; but fair results, such as great temporary improvement, which were regarded as cures, have often been obtained, and are frequently obtained now."

"The management of diet, attention to muscular exercise, and regimen in general have the greater share, and the patient much more readily submits to such management at a spa away from home."

"Phosphaturia is often a cause of great anxiety to students and men of sedentary habits. Spa treatment is rarely required; an increased amount of open-air exercise is frequently sufficient to remove the trouble."

The book abounds in practical suggestions; it tells what to do and what not to do, and ought to be in the hands of every practitioner, whether he has been accustomed to use mineral waters or not. He would then, no doubt, use them more and use them more intelligently.

G. H.

THE CRYSTALLINE LENS SYSTEM: ITS EMBRYOLOGY, ANATOMY, PHYSIOLOGICAL CHEMISTRY, PHYSIOLOGY, PATHOLOGY, DISEASES, TREATMENT, OPERATIONS, AND AFTER-CHANGES, WITH A CONSIDERATION OF APHAKIA. By LOUIS STRICKLER, M.D. Cincinnati, Ohio.

IF the assertion which is made by the author in his preface be true—"that the great majority of English-speaking ophthalmologists are ignorant of Becker's classical writings on the crystalline lens"—then his work has been justified, and the elaborate compilation which he

has presented will be acceptable and of value to the profession. The volume before us is a faithful exposition of Becker's views as presented by him in *Die Pathologie und Therapie des Linsensystems*, 1877, and *Zur Anatomie der Gesunden und Kranken Linse*, 1882, and contains, in addition, a most comprehensive review of all that has been published upon the lens since that time. The reviewer, however, questions the value of compilations of this kind, and fears that the ophthalmologist who has not already familiarized himself with the writings of the master will scarcely care to peruse the often dry and second-hand statements of the abstractor.

The profession at large will probably find but little to interest them in a work which deals with a purely technical subject in the language of the specialty to which it belongs, except in so far as it treats of the manner in which the general system may be implicated in the origin and development of opacities of the lens.

It may not be amiss, therefore, to note if the author has been able to refer the cause of cataract to any systemic affection other than the rare instances in which the lens becomes clouded in diabetes. The author, however, seems to have rather neglected this particular phase of the subject, and while he mentions that chronic nephritis may give rise not infrequently to diseases of the deeper tunics of the eye, he does not think it possible to trace any causative relationship between renal disease and cataract. He does not mention the influence of gout in favoring the development of cataract by inducing changes in the choroid and ciliary body, the sources of nourishment of the lens, nor does he call attention to the possibility of uncorrected errors of refraction favoring lenticular haze by inducing changes in the same structures.

In view of the cures of cataract without operation, which have been much advertised of late by certain sanitariums, a word concerning the so-called "absorptive treatment" may not be out of place here. Outside of the rascality which is practised in duping many of the victims of such institutions by the temporary improvement in vision in cases of nuclear cataract, by a dilatation of the pupil with atropine, advantage has undoubtedly been taken of the fact that it is possible in a limited number of cases to retard further degeneration of the lens, or even to induce a partial restoration of transparency in it by a strict regimen of the diet and life of the patient and by the careful correction of all refraction errors. This is particularly true of those forms of cataract which are seen in diabetic, gouty, and rheumatic individuals. There is reason to think, therefore, that many of the improvements in vision which have been reported in these institutions resulted from the rest and attention which the patient received while there. It is well to remember, therefore, that one of the first requisites in the treatment of cataract should be to try and discover if there be anything in the manner of the life of the individual which would tend to interfere with the proper nourishment of the lens; and here the case often passes beyond the province of the ophthalmologist into that of the physician.

The cure of cataract is necessarily, however, almost always a surgical procedure, and consists in the removal of the crystalline lens from the eye, and so brilliant has been the success of modern ophthalmologists in the performance of this operation that it seems not amiss to mention some of the statistics of the results which attend their efforts.

The latest authoritative statement upon the subject is from Knapp

(*A System of Diseases of the Eye*, by Norris and Oliver, vol. iii. p. 818). This author shows that of 600 favorable cases satisfactory vision was obtained by the removal of the lens in 95 per cent., moderate vision in 3 per cent., and complete failure in but 2 per cent.; and of 400 cases, which comprised fifty-seven eyes with serious bodily or ocular complications, good vision was obtained in 90 per cent., moderate vision in 7 per cent., and only 3 per cent. were total failures.

When one reflects upon the extreme delicacy of the anatomy of the eye, and the nicety which is demanded in the performance of so difficult a procedure as the removal of its lens, we cannot help but admire the skill which is employed and the high degree of perfection which is attained by ophthalmologists in restoring one of the most essential of the faculties to so many of the individuals in the community.

The author has appended a bibliography which contains 3433 references, and which brings the literature of the subject up to date. The whole treatise shows that the vast literature has been extensively, and, as a rule, judiciously utilized, so that it will become a valuable work of reference to the ophthalmologist. W. C. P.

A Manual of Physiology, with Practical Exercises. By G. N. Stewart, M.A., D.Sc., M.D. (Edin.), D.P.H. (Camb.). Philadelphia: W. B. Saunders.

The third edition of this *Manual* shows numerous alterations in the text, while a great many experiments have been added in the practical exercises. The book is splendidly arranged, and shows the tendency in the teaching of this subject at the present time. One might as well teach anatomy or chemistry without practical work as to attempt to give instruction in physiology without practical exercises.

The subject is presented in an unusually attractive, clear, and forcible way, and the practical experiments are arranged so as to make the matter of the text clear and impressive. Many of the experiments are too difficult to be performed except under the direction of a demonstrator. All the subjects are treated very evenly. The text is very well suited for busy medical students, as it does not go too much into details and yet presents the subject completely.

The book opens with a brief introduction on the functions of living matter, and then follows a practical exercise on proteids, carbohydrates, and fats. It would have been an advantage to have given first some consideration of these important food-stuffs in the text, and to have extended the practical work of this exercise. This is very important for medical students, for few medical schools, at least in this country, have separate chairs of physiological chemistry.

The circulating fluids of the body are next taken up, and that part on coagulation of the blood deserves special mention for conciseness and clearness. The author inclines to Lilienfeld's theory as to the formation of thrombosin from fibrinogen in the conversion of the latter body into fibrins.

The chapters on Circulation and Respiration are very good. In the former the author presents his own ingenious method of measuring the

circulation time, which gives very much more accurate results than former methods.

Digestion receives careful consideration in the text, but the practical exercises on this very important subject might be somewhat extended with advantage. The plates showing changes in gland-cells from secretion and in intestinal epithelium during absorption are very good.

The subjects of Nutrition, Dietetics, Excretion and Secretion, which are ordinarily so difficult for students to grasp, are presented in a way that can easily be followed and understood, and at the same time impress the vast importance of these subjects in practical medicine. While it is pointed out that uric acid does not lie on the direct line of metabolism from proteid to urea (p. 437), yet its relation to nucleoproteids and the xanthin-bodies does not receive sufficient consideration (p. 388) to show their close connections.

Internal secretions are rather briefly treated, especially that of the thyroid gland. Wise conservatism is shown in not accepting as established, as is too often done, the statement that the symptoms of athyroidea are due to the removal of the parathyroids, and not of the thyroids proper.

In discussing animal heat the author mentions the well-established fact that injuries of certain parts of the central nervous system will cause rise of temperature and disturbance of heat regulation, but does not call every such area "a heat centre," with functions more hypothetical than proven.

The author states in dealing with nerve and muscle that at least some voluntary contractions are not tetanic in nature. It has always been hard to explain the shortest voluntary movement as a tetanus, and this is certainly a step in the right direction.

A separate chapter is given on Electro-physiology. This is of questionable advantage in a book of this size, intended for medical students, as much of it could be omitted and the electrical phenomena of nerve and muscle could be introduced with those subjects.

Speaking of the degeneration of nerves and muscles, the statement is made (p. 586) "the 'reaction of degeneration' is only obtained when the lesion is situated below the level of the cells of the anterior horn." Doubtless it was intended to include these cells also.

It is pointed out that the evidence formerly adduced to prove the existence of specific trophic nerves fails in its purpose, and that specific trophic nerves do not exist. This does not prove, however, that the nutrition of the tissues is not under the influence of impulses coming from nerve centres. In this connection it is stated (p. 588) that "the nutritive alterations in muscles and salivary glands after section of motor and secretory nerves seem to depend largely on functional and vasomotor changes." Later, however, in discussing the centres of the spinal cord, it is admitted that it is difficult to understand the degeneration of muscle after section of its nerve except on the hypothesis that impulses from the cells of the anterior horns influence their nutrition. It certainly is difficult to explain these changes, or those changes occurring clinically when these cells are involved by disease, except on such an assumption.

The central nervous system is well presented. Following Shäfer, the author applies the term *neuron* to the axis cylinder process or axon given off by the nerve cell. It is a very great misfortune that there is

not greater uniformity in our nomenclature. It would seem much better to apply the term neuron to the unit of the nervous system—the cell with all of its processes.

Altogether the book is a very good one—for students' purposes perhaps the best we have. It will also be quite as useful to the practitioner, being concise and complete, and at the same time abreast of the times, containing the results of progress made in this branch in recent years. The fact that it has reached the third edition in so short a time indicates the favor with which it has been received in the past. With its improvements it will doubtless give still greater satisfaction in the future. W. S. C.

ATLAS DER SYPHILIS UND SYPHILISAEHNLICHEN HAUTKRANKHEITEN FÜR STUDIRENDE UND AERZTE. Von DR. MED. MARTIN CHOTZEN, Heft xi., xii. Hamburg and Leipzig: Leopold Voss, 1898.

ATLAS OF SYPHILIS AND SKIN DISEASES RESEMBLING SYPHILIS.

THESE two parts, containing thirteen plates, presenting twenty-two portraits of various syphilitic lesions and lesions resembling syphilis, complete this excellent *Atlas*. The greater number of the portraits are those of the late lesions of syphilis, such as serpiginous ulcer of the scalp and forehead, paronychia and ulcerating onychia, ossifying periostitis of the legs, the last being an excellent reproduction of a skiagraph. Four plates are devoted to the lesions of hereditary syphilis and one to syphilitic affections of the larynx and eye. Upon the whole the plates are quite up to the standard set in the preceding parts, which have already been noticed; and the *Atlas* will be found a very useful aid in recognizing syphilitic diseases and in distinguishing them from those affections which are apt to be mistaken for them. M. B. H.

THE AMERICAN YEAR-BOOK OF MEDICINE AND SURGERY: BEING A YEARLY DIGEST OF SCIENTIFIC PROGRESS AND AUTHORITATIVE OPINION IN ALL BRANCHES OF MEDICINE AND SURGEBY. Drawn from journals, monographs, and text-books of the leading American and foreign authors and investigators. Collected and arranged with critical editorial comment under the general editorial charge of GEORGE M. GOULD. Illustrated. Philadelphia: W. B. Saunders, 1899.

IN examining the current issue of the *Year-book* we are impressed first with its value as an illustration of certain general movements in medicine. Thus in the infectious diseases we note that the literature of yellow fever for the past year has been much more extensive than usual, whereas the literature upon bubonic plague, which had been occupying so much attention and which filled such a considerable space in the *Year-book* for 1898, has diminished very considerably. The editors of the section on General Medicine insist more strongly than ever upon the value of the Widal reaction. In particular it has led to the recognition of the frequency of typhoid infection without the characteristic intestinal lesions. Probably it was impossible, on account of its recent appearance, to pay any attention to the work that has been done

in tropical disease as a result of the recent Spanish-American war, but we shall expect to see this in the succeeding issue. A slight error in arrangement is noted in the section on Infectious Disease—that is, the inclusion of cases of streptococcic infection under the head of relapsing fever. In the section on Tuberculosis there is further confirmation of the apparently very doubtful utility of sera employed therapeutically. The results of some of the recent work upon metabolism are also noted. In the section on Surgery we are most impressed by the paramount importance of the work upon the gastro-intestinal tract, almost one-half of the abstracts being devoted to this branch. In the other sections it is of interest to note the increased amount of work devoted to obstetrical pathology and the growing conservatism of the gynecologist. The nervous section is well written, but many valuable articles have unquestionably failed to receive recognition, and we believe that they might well have replaced some of the abstracts that have been inserted. Thus, a cursory examination of the references failed to reveal any to the *Archiv der Psychiatrie*, perhaps the most important neurological journal published; nor were other leading foreign journals cited as frequently as would seem to be desirable. The sections on Physiology and Legal Medicine are remarkable examples of condensation, particularly the latter, Dr. Johnson appearing to have read pretty nearly everything in his province and noted it, if only in a very few words. The illustrations are rather various in value, the result, of course, of the fact that they have been obtained from very different sources. Nearly all of them are good, although we think that Plates I. and IV. are decidedly less successful, and certainly less illustrative than the others. The plates taken from Ziegler's *Beiträge* are very beautiful, and the one illustrating Dr. Posey's article on Congenital Malformations of the Iris is very clear and satisfactory. Of course, a certain number of repetitions are inevitable, but it seems that Zeehuisen's article on a method of dilating the œsophagus need not have been abstracted at length in two sections. The most serious defect in the work is, we believe, the absence of any indication, excepting a sort of apologetic note in the preface, of the period of time represented by the literature in the present volume. Of course, one can form a pretty good idea of what this is from the dates of the references, but it would be far more satisfactory, we believe, both to the editors and the readers, if the latter knew just what limits were determined upon, and therefore could understand why certain articles were omitted. We have more freedom in speaking of blemishes in this work than we should have deemed justifiable in regard to another, for it is practically indispensable to a physician who has any desire to keep himself familiar with current medicine in more than a single small branch. Medical literature is at present so abnormally enormous that without some satisfactory *résumé* no one can hope to keep even approximately abreast of it. It is a pity, we think, that some method has not been devised whereby books as well as articles could be treated in this manner; but the difficulties in the way of such an undertaking are obviously considerable. There is no question that the *American Year-book of Medicine and Surgery* is superior to any similar publication in the English language, and for convenience and compactness easily surpasses its German rivals. Sometimes, indeed, we feel that compactness has been slightly overdone, but this is certainly a fault in the right direction. The work can be cordially recommended. J. S.

PROGRESS

OF

MEDICAL SCIENCE.

MEDICINE.

UNDER THE CHARGE OF

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Phlegmasia Dolens, or Milk Leg, in Typhoid Fever.—J. M. DA COSTA (*Boston Medical and Surgical Journal*, March 23, 1899) considers this interesting complication as illustrated by soldiers admitted to the Pennsylvania Hospital. Phlegmasia dolens is not a common occurrence in typhoid fever. The general percentage of cases showing this complication in the hospital was not over 1 to 2 per cent. Murchison, in his treatise, estimated it at 1 per cent. There were, however, thirty cases, or almost 14 per cent., among 215 cases of typhoid fever in soldiers admitted to the hospital. In eighteen of these thirty cases the left leg was affected alone in three, the right alone in two, and both in thirteen, the latter generally beginning on the left side when not appearing simultaneously in both. Da Costa thinks that the greater tendency of this complication to occur in soldier patients may possibly be attributed to relaxation with distention of the venous system in the legs, due to marching, thus predisposing them to the disease. The cases occurred in those patients in whom the typhoid fever had been very severe, and generally at the end of the fever. He thinks that the primary factor in the etiology of the disease is a thrombosis of the veins, and not a phlebitis or periphlebitis, as was promulgated by Sir James Paget. Da Costa thinks that the phlebitis is a secondary process, the thrombosis being primary. The cases should be treated by elevation of the leg; application of compresses wet with lead and opium lotion, or witch-hazel distillate; laxatives, in constipation; in persistent pain, belladonna plaster strips along the veins; absolute rest in bed; continued mechanical support of bandages, etc., after the patient gets out of bed, until the veins recover their tone and all symptoms of obstruction are past. Massage should be avoided as long as there are signs of venous disturbance.

Antitoxin Treatment of Diphtheria.—The results obtained from the use of antitoxin in diphtheria, as published in the February *Bulletin of the Department of Health*, city of Chicago, should be sufficiently convincing to demonstrate to any skeptic the efficacy of this form of treatment.

From October 5, 1895—the date of the first administration of antitoxin by the department—to February 28, 1899, a period of nearly three and one-half years, a total of 6342 reported cases of diphtheria were visited by the department inspectors. Of this number 4311 were bacterially verified as true diphtheria, and 4076 were treated with antitoxin—the remaining 235 either refusing antitoxin treatment or being treated by other physicians, the results not being known. The results show 3795 recoveries out of the 4076 cases treated by the department. There were 276 deaths, and five cases were still under treatment at the close of February, 1899.

The figures of recoveries, 3795, and of deaths, 276, give a mortality-rate of 6.77 per cent. in 4071 cases of bacterially verified diphtheria treated with antitoxin.

The results for the four months previous to the publication of the *Bulletin* were even more favorable. During November and December, 1898, and January and February, 1899, 423 cases were treated. There were 398 recoveries, 20 deaths, and 5 remained under treatment on February 28th. The average mortality-rate was 4.78 per cent. in the completed cases. There was no death among 129 cases treated on the first or second days of the disease, and only 3 deaths among 114 treated on the third day—a mortality of 1.23 per cent. in 243 cases. Nine per cent. of the cases, or 38 in number, required intubation, with 30 recoveries and 8 deaths—a mortality of 21 per cent. for laryngeal stenosis, or less than two-thirds the mortality-rate of all diphtheria cases in Chicago prior to the introduction of antitoxin.

The further analysis of the 4071 cases of diphtheria is of interest. In 355 cases treated on the first day of the disease there was only one death—a mortality of only 0.28 per cent.; in 1018 cases first treated on the second day of the disease there were 17 deaths—a mortality of 1.67 per cent.; in 1509 cases first treated on the third day of the disease there were 57 deaths—a mortality of 3.77 per cent.; in 720 cases first treated on the fourth day there were 82 deaths—a mortality of 11.39 per cent.; and in 469 cases first treated later than the fourth day there were 119 deaths—a mortality of 25.37 per cent. These statistics show very conclusively the advisability of giving the antitoxin as early as possible.

The *Bulletin* states that the death-rate of 6.77 per cent. from diphtheria during the past three years, since antitoxin has been used, shows a decline of 43 per cent. as compared with that for the previous three years when other methods of treatment were in vogue. No evidence could be more convincing than this in favor of the efficacy of the antitoxin treatment.

Cerebro-spinal Meningitis Followed by Gangrene of the Feet.—W. P. MATTHEWS (*Medical Register*, Richmond, Va., March) reports a case of cerebro-spinal meningitis in which gangrene of the feet developed. The patient was a colored woman, aged twenty-five years. The illness began on April 22, 1898, with a severe chill, followed by intense headache and backache. Vomiting was a prominent symptom, and there was makerd stiffening

of the back and neck muscles. Retraction of the head was marked. The pulse was slow, full, and bounding. The patient's condition gradually became worse, and stimulants were used freely. Improvement afterward set in until early in May, when gangrene of the toes of both feet developed. The feet were wrapped in compresses saturated with bichloride solution until a line of demarcation was established. It was necessary subsequently to amputate a portion of the phalanges and a part of the second metatarsal of the left foot. Matthews thought that the gangrene was due to the administration of ergot, which had been given in drachm doses every four hours at the beginning of the illness. The patient recovered.

Deep Reflexes of the Lower Extremities.—CHARLES K. MILLS (*Journal of Nervous and Mental Disease*, March, 1899) reports and discusses a case of loss of knee-jerk with retention of ankle clonus, in which the symptoms were due to a combination of muscular and nervous disease of somewhat uncertain pathology, although he suggests a toxæmia as the cause. He discusses the literature of the syndrome, which is limited, and offers the following conclusions as to its etiology:

1. The syndrome may be due to a compression by a destroying lesion, such as caries with pachymeningitis, or transverse myelitis, involving the spinal cord in the region of the patellar reflex arc, namely, somewhere between the second and fifth lumbar segments, and most probably the second or third lumbar segment.

2. The syndrome may be due to a disseminated sclerosis, foci of sclerosis being present both in the reflex arc for the patella and in the lateral columns.

3. The syndrome may be due to focal lesions, like hemorrhage, softening, or cavity formation, attacking points in the reflex arc, and also the lateral columns.

4. The syndrome may be due to peculiar forms of developmental arrest of the spinal cord, as, for instance, to defect in the gray matter of the lumbar segments and in the lateral columns.

5. The syndrome may be due to a combination of muscular and neural disease, as in my case and as was probably also the case in the man suffering from typhoid fever as recorded by Fleury. It is known that hyaline degeneration of muscular fibres occurs especially in typhoid fever. Fleury's case was probably in its pathology not unlike my own.

6. On theoretical grounds it seems probable that the syndrome might be due to a focal lesion in the cerebral cortex, or in the cortical spinal (pyramidal) tract, or to arrested development of the tract associated with disease (inflammation or degeneration) limited to the crural nerves and their muscles.

The article further discusses the question of the significance of the ankle-clonus in diagnosticating organic from functional disorders, especially hysteria. Mills, like Gowers, holds to the opinion that the presence of true foot-clonus is, aside from conditions with contracture, a symptom of organic disease. It is from hysteria in particular that this diagnostic is greatest, and the medico-legal bearings of the question are obvious. He admits that toxæmic conditions may be accompanied with this symptom, and that leaves open the way to a large number of apparent exceptions to this rule. There

is no certainty that the symptoms of what we may diagnose as neurasthenia or hysteria may not in some cases include in their etiology a toxæmic element. Mills also discusses the patellar clonus, which he places in the same general category, as regards its diagnostic significance, as the ankle clonus, and tendo Achillis jerk in tabes. He gives some weight to this last symptom as aiding in the diagnosis in doubtful cases, though he apparently does not quite agree with Babinski that it is as important as Westphal's sign. Finally, he calls attention to the tendon and muscular reflexes in the diagnosis of encephalic tumors from tabes. When the muscle as well as the tendon phenomena are absent the diagnosis of tumors is more probable. In all the cases (twenty-eight) of tabes examined, the quadriceps and gastrocnemius muscle phenomena were present. He considers their absence in tumor to be due to a toxæmia excited by the growth.

The Localization of Cerebellar Tumors and their Differentiation from Chronic Internal Hydrocephalus.—RUDOLF SCHMIDT (*Wiener klin. Wochenschrift*, 1898, No. 51) observed two cases that seem to throw a useful light on this subject. In one case there was an angiosarcoma of the left cerebellar hemisphere; in the other a glioma of the right hemisphere, with compression of the aqueduct of Sylvius, and internal hydrocephalus. In both cases vomiting, vertigo, and tinnitus came on as soon as the patients lay on the right or left side respectively. The author looks on this as the result of compression of the aqueduct of Sylvius and the veins of Galen, and the regularity with which the symptoms appeared on assuming the lateral position give the observation the force of an experiment. The effect of position on the side indicates not only the asymmetry, but also a considerable degree of weight of the lesion, so that when the symptom is present a large tumor, and one near the median line, may be supposed to be present. The occurrence of symptoms of compression in the lateral position only is, therefore, of value in excluding chronic serous meningitis, which in many respects may present similar symptoms, and also median obstruction, such as cysticercus of the aqueduct or the fourth ventricle, and also hysteria. The author also found the knee-jerk absent in his cases, and thinks this sign may also be of value in the differential diagnosis of cerebellar tumors and chronic internal hydrocephalus.

On the Efficiency of the Fatty Degenerated Heart.—HASENFELD and VON FENYVESSY report some interesting experiments (*Berliner klin. Wochenschrift*, 1899, No. 7). They summarize their conclusions as follows: 1. Even severe degrees of acute fatty degeneration of the heart-muscle cannot be recognized during life, because the degeneration does not materially influence the cardiac functions and does not cause any striking symptoms. 2. The efficiency of the heart-muscle with acute fatty degeneration, whether of high or low degree, is not notably affected. The acutely degenerated heart-muscle is not only able to respond to the usual demands on its strength as well as the normal heart, but it is also able to furnish an extra amount of work. 3. Only shortly before death can signs of loss of compensation be observed in a heart degenerated by phosphorus. Even with intense degeneration, however, the heart could still be stimulated by adrenal extract, for the heart-

muscle in phosphorous-poisoning is much more sentitive to lack of oxygen than the normal. 4. Failure of the circulation in phosphorous-poisoning is largely due to weakening of the vasomotors. Pregnant animals bear phosphorous-poisoning very badly; even the parenchymatous organs of the embryos show fatty degeneration. These results the authors ascribe to the enormous amount of the accommodation of the heart-muscle, and they think it also possible that the heart, even in chronic degeneration, still has a sufficient functional ability. They also draw the conclusion from their experiments that the fatty degenerations most frequently found in the human body, especially those that are not of long duration, cannot be diagnosed, and that the condition of cardiac weakness, so often observed, cannot be referred to fatty degeneration of the heart-muscle. They do not deny that there is a relation between the degneration and the loss of compensation, but think that in most cases the degneration is the result and not the cause of the loss of compensation. Certain it is that a number of causes of fatty degeneration have no effect on the force of the heart, and it is quite possible that certain substances that cause a fatty degeneration can also weaken the strength of the heart. It should be added that the changes the authors have considered are only the parenchymatous ones. They believe that the interstitial changes are much more injurious on the reserve force of the heart than parenchymatous degenerations.

Thrombosis in Pulmonary Tuberculosis.—RUGE and HIEROKLES (*Berliner klin. Wochenschrift*, 1899, No. 4) examined the clinical records of 1778 cases of phthisis, and found the complication of venous thrombosis 19 times, or fully 1 per cent. Undoubtedly this complication is more frequent than these figures indicate, since in many cases the clinical signs are not marked, and in autopsies the veins are often not examined. The œdema is often trivial, especially if the collateral circulation is quickly established. The pain at times may be slight or even absent. The age of the patients had a wide range: Between twenty and thirty years there were 6 cases; between thirty-one and forty years, 7 cases; and between forty-one and fifty years, 5 cases. One patient was sixty years old. Women seem especially prone to thrombosis. In this series there were 12 women and 7 men. The complication was usually found in severe cases of phthisis, and appeared, as a rule, two or three weeks before death, but in one case the patient recovered from the (femoral) thrombosis. The veins of the lower extremities were most frequently involved, after that the right ventricle and the pulmonary artery, and less frequently other veins. The authors give a brief résumé of the theories of thrombosis without committing themselves to any one. A useful bibliography is appended.

A Peculiar Case of Rupture of an Aortic Leaflet.—OSTWALT saw an old man with sudden blindness in one eye and with the typical picture of embolism of the central artery of the retina. The patient had atheroma and albuminuria with hyaline casts; the heart was irregular, and there was a diastolic aortic murmur. A week before the eye became blind the man had undergone a sudden strain, followed by very severe palpitation of the heart, and a pain in the inguinal region. This was followed a few days later by a hernia.

The blindness developed the day after the strain. On account of the physical signs and the time of occurrence of the symptoms the author rejects the idea of aneurism and of embolism from an old arterio-sclerotic patch, and concludes that an aortic leaflet had been torn at the time of the strain. He has been able to find references to twenty other cases of rupture of the aortic valve, including some overlooked in the study made by Barié in 1881. In most cases the cause was a severe muscular exertion, producing sudden elevation of the blood-pressure, especially in the aorta. If the valves are already weakened by disease, rupture is all the more probable, and in such cases can occur from very slight exertion, as rising from bed, but previous disease is not necessary. The rupture most frequently occurs at the insertion, rarely in the middle of the flap or in a radial direction. The symptoms of the rupture are usually such as severe pain, either in the heart region or between the shoulders. Palpitation, great irregularity of the heart's action, and dyspnœa are added. Cyanosis, cold sweats and œdema appear. In some cases fainting spells occur. The physical signs of insufficiency of the affected valve are present, the blowing murmur being especially characteristic, and sometimes audible at a distance. In cases like the author's, in which the symptoms improve, the murmur usually persists. But in the present case, and in one other, reported by Anstie, the murmur ceased also, and Ostwalt thinks that in both cases the torn place in the valve had healed. In a case with symptoms so mild as in the present one the condition would have been overlooked had it not been for the retinal embolism.—*Berliner klin. Wochenschrift*, 1899, No. 5.

On Achondroplasia.—Flemming (*The Bristol Medico-Chirurgical Journal*, March, 1899, p. 21) reports a case presenting the features of the interesting condition known as achondroplasia, or, as it is sometimes less properly called, fœtal rickets. The disease occurred in an eight-months still-born male child. Except for an enlarged abdomen, the trunk was normal. The head was large, soft, and shapeless. Only toward the base of the skull could any resisting bone be felt. The skin about the face and neck was much thickened. The chief deformity was in the extremities, which were very short in proportion to the trunk, markedly curved and bent, with relatively small hands and feet. The character of the deformities is described in detail. The skin was everywhere thickened. The thickening was in part due to an increase in the deeper areolar layer, and not merely to an increase in the subcutaneous fat. The tongue appeared too large for the mouth, similar to what is seen in sporadic cretinism. There was no gross nor microscopical change in the thyroid. The thoracic and abdominal organs appeared normal.

The cartilaginous epiphyses of the long bones were enlarged in every direction, and did not present the usual white line at their junction with the diaphyses. The bones were easily cut with a knife from end to end; the shafts of the long bones had merely a thin casing of bone, and the cancellous bone inside felt only gritty to the knife. The cranial bones were not stiffer than a sheet of writing paper. The clavicle and ribs, though soft, were normal in shape and size, and the pelvis showed no marked deformity.

After describing in detail the development of bone normally and that in achondroplasia, Flemming says: "It would seem, then, that while owing to

some dystrophy the skeleton maintained for a long time its embryonic form, there was some special affection of the epiphyseal cartilage, whereby its ossification was not only delayed, but reduced almost to a minimum.

"While, then, the periosteum is forming bone, the cartilage on which the length of the bone depends is inactive, the consequence being that although the bone has a normal, or nearly normal transverse diameter, it is at the same time greatly reduced in length. Bones in the growth of which the cartilage takes but a small part, such as the clavicle and the ribs, are not shortened, and bones developed in the membrane are of natural size."

Achondroplasia is characterized by lesions of the skeleton, which are symmetrical and chiefly in the long bones; the latter are thick, short, hard, and compact, and where bent the bending is always in the diaphyses and in the same direction. It is not entirely a local disease of the bones, for it is accompanied by profound nutritional disturbances, in particular by a great thickening of the skin.

The affection does not involve the trunk or the head, except at the base of the skull, which is contracted and has the bones prematurely united. Some cases are, however, hydrocephalic. The disease comes on and completes its evolution in the earlier months of pregnancy, so that when the child is born the lesions are cured and the initial disorders escape notice. One authority, however, states that the disease may be active until the twenty-sixth week.

The bone when formed is very hard, and the epiphyses are greatly enlarged. The appearance of a case of achondroplasia suggests a cretinoid condition, if it is not actually a phase of sporadic cretinism. Flemming states that one of the interesting features of his case was the persistence of the disease until a very late period of fœtal life. He lastly gives the points which differentiate it from rickets and inherited syphilis.

F. H. Edgeworth, in discussion, presented photographs of achondroplasia in a man, aged fifty-nine years, whose height was only 4 feet 8 inches. The shortness of stature was entirely due to deficiency in the length of the long bones of the legs, the body being well developed. The etiology of achondroplasia is obscure. Thomson and Symington have shown that the essential skeletal abnormalities of the disease are of two kinds—premature synostosis of the basicranial axis and defective endochondral ossification—so that the diaphyses of the long bones are shorter than usual. They also pointed out that the only disease to which achondroplasia has a resemblance is sporadic cretinism. Edgeworth suggests that achondroplasia may be due to a disturbance of the function of the thyroid gland early in intra-uterine life, producing the characteristic skeletal changes. He believes that later the gland performs its function normally, preventing the nutritional disorders which are characteristic of sporadic cretinism.

The Heart in Chlorosis.—GAUTIER (*Deutsches Archiv f. klin. Med.*, Band lxii. Heft 1 and 2) has made an exhaustive study of the literature of this subject, and has carefully examined twenty-two cases. His observations on the heart were made by deep percussion, and noting the lateral extent, measured on both sides from the median line. The author's conclusions are as follows:

1. In twenty-two cases of chlorosis, in which no other cause for an altera-

tion of the heart was present, twenty showed an enlargement of the relative heart-dulness, which in a few cases was very marked.

2. This increase should be due only to an increase in the size of the heart.

3. The symptoms during and after the chlorosis allow us to assume that the heart was dilated and hypertrophied.

4. In some cases the enlargement subsided after the symptoms of chlorosis ceased; more frequently the heart remained enlarged for some time after, and slowly attained normal size.

5. The causes of the dilatation and hypertrophy culminate in those of the chlorosis itself.

6. In chlorosis there is a diminution of the functional power of the heart; the normal circulation offers such a heart unusual difficulty, and in consequence it becomes dilated and hypertrophied.

7. In chlorosis there is a convincing example of a transitory hypertrophy.

8. The pathogenesis of the cardiac hypertrophy in chlorosis indicates the importance of congenital or acquired power in the development of any hypertrophy of the heart.

Pyelonephritis and Ulcerative Endocarditis as a Complication of Gonorrhœa.—Berg (*Medical Record*, April 29, 1899, p. 602) reports the following case: A man, aged twenty-one years, was admitted to the Mt. Sinai Hospital, August 7, 1898, with a history of having contracted gonorrhœa twelve days previously. Nine days later, August 4th, he had a sudden chill, followed by fever and swelling of the metatarso-phalangeal joint of the left thumb. On August 11th he complained of pain and tenderness over the left kidney. There was great tenderness on palpation in the left lumbar region behind. Pus-cells and granular casts were found in the urine on the previous day. His temperature had been very high at intervals for several days. From the symptoms a diagnosis of septic (gonorrhœal) pyelonephritis was made. The chills persisted, and several convulsions occurred. On August 23d a loud, blowing murmur was heard at the apex for the first time. The second sound at the apex was enfeebled. Over the base of the heart there was heard a rough, blowing, systolic murmur, with absent second sound. This murmur was transmitted upward and downward, and was best heard over the upper portion of the sternum. Death occurred suddenly on August 24th.

An autopsy was performed, the main features of which were as follows: On two of the segments of the aortic valve there were large vegetations, with ulcerations. One of the flaps was perforated. Upon one of the segments of the mitral valve, about 1 cm. from the free border, there were two small, yellowish nodules. The spleen showed one small infarction. The pelvis of the left kidney showed a few hemorrhagic spots, about the size of pin-heads. In both pelves there was a small amount of whitish, turbid fluid. The kidney, on microscopic examination, showed the features of an acute pyelonephritis.

Blood-cultures were taken twice before death, with negative results. Gonococci were found in the cover-slips from the vegetations on the aortic valves. Diplococci, not stainable by Gram's method and believed to be gonococci, were also found in the fluid in the pelvis of the left kidney. Cultures were not taken from the heart's blood.

Berg states that for many years it was held that ulcerative endocarditis complicating gonorrhœa was due to a mixed infection with some other organism than the gonococcus. Since 1894, however, many competent observers have reported cases in which only the gonococcus was found in the blood and on the cardiac vegetations. Councilman, Gluzinsky, and Leyden have reported such cases. One of the most valuable cases was that reported by Thayer and Blumer. Not only was the gonoccoccus found on the heart valves, but it was grown in pure culture from the blood during life, showing that the gonococcus may pass by means of the blood current to distant parts of the body, and there give rise to infections.

PEDIATRICS.

UNDER THE CHARGE OF

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The Micro-organism of Scarlet Fever.—WILLIAM J. CLASS (*The Chicago Medical Recorder*, May, 1899, p. 373), referring to the unsatisfactory results of the investigations of Kleim, of Crajkowski, and of other careful observers in isolating a specific micro-organism of scarlatina, concluded that the fault lay with the culture media employed. After various failures he has succeeded in finding a medium on which he has been able almost invariably to obtain, both from the scales and from the throats of scarlatinal patients, the growth of an organism which presents such characteristic features, both in its morphology as well as in its growth, that he believes it to be the specific germ of scarlet fever.

It is a diplococcus resembling, as ordinarily seen on slides made from fresh cultures, a very large gonococcus. This biscuit-shaped appearance is best seen in specimens that have been but slightly stained. In these is also noted a transverse line running through each half of the organism, giving it the appearance of a tetrad. The size varies. It is always considerably larger than the ordinary pus microbe. Lancet-shaped forms, as occur in the pneumococcus, are never met; but streptococcus forms are occasionally, though rarely, observed, as are also single cocci. They have no capsule and show no spores. Specimens from pure cultures are satisfactorily stained by watery solutions of methylene-blue, by carbol-fuchsin, Bismarck brown, and Pitfield's flagellæ stain. They are decolorized by Gram's method, though not to the same extent as the gonococcus, the larger variety holding the stain somewhat better than the smaller.

The culture medium consists of glycerin-agar, to which is added about 5

per cent. by weight of black garden earth, previously sterilized by discontinuous heating. On this medium the scales of a scarlet fever patient are placed with a sterile platinum loop, and the tubes put in an incubator, the temperature of which is kept at about 35° C. Within forty-eight hours to one week small, whitish-gray semi-transparent colonies appear along the track of inoculation and around the scale. On agar-agar, glycerin agar, and gelatin there is no growth, and bouillon is not clouded. Milk does not appear to be affected, but the organism apparently multiplies in it. On potatoes there is no growth.

Rabbits and guinea-pigs were not affected by subcutaneous injection of pure cultures, by scarification and inoculation of the wounds produced, and by intra-abdominal injection.

The germ described has been cultivated from the scales of about thirty cases of typical scarlatina, and has also been found in the throats of these patients and in cases of angina occurring in persons exposed to scarlet fever in whom no eruption appeared, and lastly in the throats of children in a family where one member had typical scarlatina, the children being in normal condition when the culture was made, but subsequently developing a typical rash, in the scales of which the same organism was found.

Enormous Doses of Laudanum Taken by an Infant.—WALTER F. BOGGESS (*Archives of Pediatrics*, May, 1899, p. 358) reports having seen a child of nine months, very small for its age, not weighing more than eight or nine pounds, but bright and well nourished. For six months the mother had been in the habit of giving it laudanum for colic, and had given from four to twenty drops of the drug five or six times a day—a total of one and one-half to two drachms in the twenty-four hours.

While under the influence of the drug the baby was very bright, but during intervals, when the effect had worn off, it would become fretful. Satisfactory recovery followed gradual but rapid withdrawal of the drug.

[It is possible, as suggested by one of those discussing the report, that the laudanum given in this case was what is called "half-strength," which is quite commonly sold across the counter to the laity. Even at this estimate the case is remarkable as showing how large a quantity of the drug a baby opium-habitué can tolerate.—ED.]

Treatment of Anæmia and Athrepsia in Infants by Hypodermatic Injection of Yolk of Egg.—MUGGIA, of Turin (*Revue mensuelle des Maladies de l'Enfance*, May, 1899, p. 240) uses for this purpose the yolk of freshly-laid hen's eggs carefully washed before opening. The yolks are received in a sterile glass vessel, are then weighed and mixed with a third of their weight of physiological solution of sodium chloride. The mixture is then agitated with a glass rod and filtered through absorbent gauze. The resulting liquid is of homogeneous consistence. The initial injection is 1 c.c., and is made beneath the skin of the buttocks or of the lumbar region. There is no local or general reaction, provided the rules of asepsis are carried out and the region of injection is slightly massaged. The quantity is gradually increased till a limit of 10 c.c. is reached. The duration of treatment varies according to the case, but should not be less than 20 injections of at least 5 c.c. each.

According to Muggia's observation, these injections increase considerably the body-weight of athrepsic infants, the percentage of hæmoglobin and the number of red corpuscles, and this much more rapidly than lecithin administered in the same way.

Modifications of the Blood in Scarlatina.—Van den Berg (*Archiv f. Kinderheilkunde*, Band xxv. S. 321) has made a study of the blood changes in twelve cases of scarlatina observed in Baginsky's clinic. He finds that there exists always a hyperleucocytosis which reaches its maximum from the fourth to the sixth day after the onset of the disease, and lasts about thirty days. The degree is variable, but in general the number of leucocytes is two to three times that of the normal. Desquamation or fever exercises no appreciable influence upon the intensity of this leucocytosis.

The number of red corpuscles is increased, independently of the state of the temperature; often during desquamation evidences of degeneration of red corpuscles are observed. Hæmoglobin is at first increased; it then diminishes and subsequently increases again. The influence of fever here is variable—sometimes an increase, sometimes a diminution in the quantity of hæmoglobin. The modifications in the specific gravity of the blood are very variable. The relation between red and white corpuscles is either normal or slightly modified one way or the other.

Morphologically, the increase in leucocytes is made at the expense of polynuclear cells and intermediary forms. Ordinarily one finds 68 to 82 per cent. of polynuclear cells, and 16 to 28 per cent. of mononuclear forms. The number of eosinophiles varies, and ranges between 1, 3, and 8 per cent.

Diffuse Scleroderma Following Scarlatina.—Tchernoff (*Wratch*, 1899, No. 4, p. 93) has observed a case of diffuse scleroderma in a young girl as a sequel to a grave scarlatina which had been marked by hyperpyrexia, albuminuria prolonged for three months, endocarditis, and suppurative tonsillitis. The induration of the skin had begun at the acme of the disease upon almost the entire body at the same time, and when first seen by the author, nearly two months after the beginning of the fever, the patient was lying in the gun-hammer position, with all the limbs flexed, and complained of a sensation of being encased. The hands and feet alone were unaffected. The skin presented the appearance and consistence of that of a frozen corpse; the folds being effaced and movement over the deeper parts reduced to a minimum. The face appeared lengthened and its features immovable, the eyelids closing with difficulty. The tongue was thickened and coated, the sense of taste lost, and mastication painful; hearing was disturbed and cutaneous sensibility greatly diminished. The movements of the articulations were extremely limited, partly in consequence of the changes of the skin; but not altogether so, since the ankylosis persisted for a long time after the skin resumed its normal condition. The temperature was slightly subnormal.

The treatment consisted in daily warm baths, with massage and passive movements of the joints; and, later, gymnastics were added. Cure was complete at the end of six months of treatment.

The author has seen scleroderma develop in other children; also in a dyspeptic child of two years after bronchitis, the condition disappearing at the

end of a month and a half by the same treatment. Another child, of four months, presented induration of the skin following a grave bronchitis. In this case also the skin returned to a normal condition as the health was re-established. In all these cases the scleroderma was partial; it was never associated with œdema.

Orthoform and Aneson in Painful Mouth Affections of Children.—GÖPPERT (*Jahrbuch f. Kinderheilkunde*, 1899, Heft 1) has used both these drugs with satisfactory results as a local sedative in painful mouth affections of children. The anæsthetic effect lasts about an hour and a half, and the application is best made about twenty minutes before eating. Aneson is applied by means of a wad of cotton to the inflamed mucous membrane, and orthoform may be dusted on by the powder-blower. Both drugs have an unpleasant taste, especially the orthoform.

Treatment of Croupous Pneumonia by Antidiphtheric Serum.—BESSONE (*Annales de Médecine et Chirurgie Infantiles*, February 15, 1899, p. 160), in a series of 100 cases of pneumonia, treated twenty-one by injections of antidiphtheric serum and the remaining seventy-nine by the ordinary methods.

Of the twenty-one thus treated seven reached the crisis prematurely between the third and fourth days of the disease; two on the fourth day, and three on the fifth. In seven, on the contrary, the crisis was retarded. One case died of concomitant tuberculosis. The immediate effect upon the temperature was not constant. Usually a slight elevation of the curve was noted. No effect upon respiration, pulse, or the nervous system was observed. No albuminuria was produced by the injections. The mortality with the patients injected was 4.76 per cent., while among the others it reached 16.45 per cent. He thinks that while no specific action upon the evolution of the pneumonia was shown, the use of the serum aided the organism to throw off the infection and seemed to prevent complications.

[While there seems to be little scientific reason in such a series of experiments from a therapeutic point of view, these observations serve to emphasize the fact, already noted by those who have had any experience in immunizing large numbers of children in hospitals, that the existence of another infectious disease seems to be no contraindication to the use of diphtheria antitoxin when its specific prophylactic or curative effects are desired. They also support the view of those who plead for an early use of antitoxin in cases in which the diagnosis is still in doubt.—ED.]

A Symptom of the Incubating Stage of Pertussis.—ILLOWAY (*Pediatrics*, January 15, 1899, p. 63) has carefully observed two cases of pertussis from their very earliest development, and is thereby led to believe that the period of incubation is a much more protracted one than ordinarily described; that it is not characterized by any febrile movement or evidence of catarrh, and that it would thus remain unrecognizable but for one phenomenon which it presents, and which, perhaps, more extended observations may demonstrate to a certainty to be pathognomonic.

In the first case, a robust girl, aged five years, a slight hacking cough was first noticed not more than four or five times a day, and then only after

unusual exertion. The throat and larynx showed nothing abnormal. For two weeks the hack was noticed only in the daytime; then it occurred during the night. About three weeks after the hacking was first noticed the child began to complain of feeling tired, though she was lively and would run about the house, but would very soon become fatigued. At the end of the fourth week the character of the hack suddenly changed and the catarrhal symptoms appeared. The attack was exceedingly severe and prolonged.

In the second case, a girl, aged three years, in perfect health, the hack was present for two weeks, in about the same degree as in the first case. Two or three days later the catarrhal stage was fully developed. The disease here ran its course in a very mild form.

The author regards this hacking cough as a true pathognomonic phenomenon of the entrance into the body of the toxic agent of whooping-cough. He also thinks that the longer the period of incubation (*i. e.*, the greater the resistance of the system) the greater the infection, and the severer and more prolonged will be the sickness; while the shorter the incubation the milder the disease and the more brief the period of its duration.

If the value of the conclusions drawn from these two observations can be verified by the observations of others, the prospect of arresting the disease by the prompt application of bactericidal agents would seem more encouraging than such efforts in the past have proved to be.

Statistics of Revaccination.—Saint-Yves Ménard (*Revue Mensuelle des Maladies de l'Enfance*, March, 1899, p. 144) gives a suggestive table compiled from various French sources to show the proportions of positive results obtained by revaccination at different ages. From six to ten years (Toledano), 17.6 per cent.; at ten years (school statistics), 15 to 18 per cent.; at twenty years (military statistics), 50 per cent.; from twenty to forty years (this and the following from the statistics of La Salpêtrière), 60 per cent.; from forty to sixty years, 74.2 per cent.; from sixty to eighty years, 82.9 per cent.; from eighty to one hundred years, 88.5 per cent.

These figures clearly show that vaccinal immunity gradually disappears with time; at the age of six years it has already ceased in one-sixth of the cases. The practice of revaccinating about the seventh year is thus shown to be founded on rational grounds.

The popular opinion that elderly persons have no need of being revaccinated is shown by these statistics to be a dangerous one. Revaccination after the age of sixty has been successful eight or nine times out of ten. It is therefore evident that revaccination is most important with the aged, then in turn with adults, young people, and finally children.

Alcoholic Pseudo-Meningitis.—Ausset (*Société Centrale de Médecine du Nord*, February 24, 1899) reports the observation of a wet-nursed infant of two months, which presented symptoms very closely simulating meningitis. The temperature was 102.5°, the anterior fontanelle bulging; there was also stiffness of the neck and some diarrhœa. Headache was apparently present, for the child cried frequently and wrinkled the forehead. These symptoms appeared quite abruptly three days before the reporter was called. The diagnosis lay between meningitis, influenza (which was prevalent at the

time) and a pseudo-meningitis. Intermittency of pulse, sighing respiration, and vomiting were later symptoms. At this time the child's nurse was obliged to leave, and it was learned from another domestic that she had been in the habit of becoming intoxicated every day. After the change to a new nurse the symptoms persisted for seven or eight days, and then gradually subsided. The author attributes the condition to acute alcoholism produced by the nurse's milk.

SURGERY.

UNDER THE CHARGE OF

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The Value of Erosion and Excision in the Treatment of Tubercular Disease of the Joints in Children.—MAYLARD (*The Edinburgh Medical Journal*, June, 1899) has made a careful résumé of the results which he has obtained in the past ten years in the treatment of tubercular joints in children by erosion and excision, eliminating from his observations all cases of recent date and using only those in which he was able to obtain the remote results by examination.

He found that in no case did erosion produce shortening of the limb due to interference with its growth. On the other hand, such shortening was frequent after excisions, with a retardation in development at a distance from the seat of operation. Thus, in excision of the elbow-joint there was generally more motion obtained and less tendency to ankylosis, but in contrast to the result from erosion the development of the limbs was retarded; the hands were small and weak, so that the patient, although having better motion at the elbow, had less strength in the hand, and consequently there was a less valuable utilitarian result. He, therefore, unhesitatingly recommends erosion in preference to excision in children, and believes the practice is the more imperative the younger the child.

Tuberculosis of the Knee and Its Relation to the Development of the Limb.—LEUSDEN (*Deut. Zeit. f. Chir.*, April, 1899) gives a résumé of thirty-four cases, the careful clinical study of which, with a study of the literature of this subject, led him to the following conclusions:

1. The most complete and valuable aid in determining the condition of any portion of the skeleton is a Röntgen-ray examination.

2. In chronic tuberculosis of the knee-joint occurring during the period of development, so long as it remains in the stage of fluorescence shortening of the femur on the affected side is rare, while lengthening is frequent.

3. If this increase in development is followed later by a shortening the diagnosis is doubtful; at least this is a rare occurrence.

4. The lengthening takes place in the shaft of the femur, and is chiefly due to increased development in the lower epiphysis of the femur.

5. The cause of this increased development is found in an increased developmental irritation acting from the diseased joint upon the epiphyseal cartilage.

Phlegmon Ligneux of the Neck.—A phlegmonous condition of the neck that so simulates malignant diseases as to make the differential diagnosis difficult has been described by Reclus. KUSNETZOFF (*Arch. f. klin. Chir.*, 1899, Band lviii. Heft 3) reports a case and reviews the literature of the subject. The phlegmon develops from the deep tissues of the anterior or lateral portion of the neck, and gradually spreads out in all directions The enlargement takes place without pain, marked fever, or any noticeable disturbance of the general system. It takes weeks or months before it softens or suppuration takes place. It is characterized by no typical symptoms, and there is no involvement of the skin. The swelling restricts motion, but heat and pain are not present. After a period of four, five, or six weeks œdema of the skin occurs. Small foci of suppuration are found distributed throughout the indurated mass, but their opening and evacuation do not result in a cure, except after a slow progress of disintegration.

The etiology of this phlegmon is unknown, and until its character and the source of infection that produce it are better understood treatment will be of little avail, and its true character can only be recognized by the course its development takes and its final benignity.

An Improvement in Cheiloplasty.—The results of this operation have been satisfactory in many respects. The contraction of the lip operated upon has been overcome by various methods for the formation of plastic flaps, yet there has in all these operations been a defect from the cosmetic stand-point. The red margin of the lip has been deficient in some operations, in others one lip has been made shorter than the other.

SILBERBERG (*Cent. f. Chir.*, May 27, 1899) overcomes these drawbacks by a slight modification of the incision. When the incision for either of the generally employed plastic operations reaches the outer margin of the lip at the angle of the mouth, he carries it along the outer border of the lip, opposite to the one in which the defect is, for a sufficient distance to permit it to replace the defect of the other lip. When the closure of the defect has been accomplished by the plastic operation the red margin of the lip is found to have been equalized on both lips, the freed portion of the sound lip having been brought around to form the mucous covering of the defective.

The Surgical Treatment of Ascites.—Experiments upon animals and cases recently reported, where the portal circulation has been established by forming a collateral circulation between the abdominal parietes and the mesentery, by producing adhesions between the peritoneal surfaces, have lately been brought forward by Weir.

TILMANN (*Deut. med. Woch.*, 1899, No. 18) reviews the literature of the

subject, and points out the fact that in numerous instances of tubercular peritonitis not only the tubercular process but also the ascites was favorably influenced by a simple laparotomy.

When for any reason there is obstruction of the portal circulation a collateral circulation may be established (1) by the hemorrhoidal plexus; (2) by small veins that form between the small and large intestine and the vena cava inferior; (3) the veins in the ligamentum teres communicate with the portal vein and with the arterior-parietal peritoneum, forming the so-called "caput medusæ;" (4) the gastric veins communicate with the œsophageal.

This collateral circulation has, however, been frequently found inefficient. The author's experiments on dogs lead him to believe that in such cases a collateral circulation can be readily established by operative interference, the communication being established by producing adhesions between the parietal and visceral peritoneum. Where such a circulation has been established by a previous operation in dogs the animals will survive the ligation of the mesenteric and even of the portal vein itself. Where, however, such collateral circulation has not been established, the dogs perish if either one or both veins are ligated.

Although these operations do not permit the author to draw definite conclusions regarding the value of operative interference in this class of cases, he believes that they show that relief can be found by establishing a collateral circulation by these means.

Remarks on the Treatment of Club-foot, Based on Personal Experience of Three Hundred Cases.—McKENZIE (*Canada Journal of Medicine and Surgery*, May, 1899) summarizes his views as to the possibility and results of treatment at different periods as follows:

1. The prognosis in ordinary non-paralytic club-foot is good.
2. In children the restoration of form should be perfect, and function should closely approximate the normal.
3. Restrictive methods, either by dressings or apparatus, should be as little employed as possible.
4. Persistent manipulation improves function and development.
5. Operative treatment must be thorough. No part of the correction of deformity should be left, hoping that mechanical means will complete the work.
6. Intelligent and long-continued after-treatment is essential to a final good result. Properly constructed boots should be worn, and the foot retained in the corrected position at night.
7. Age is no bar to successful treatment. Eminently satisfactory results may be obtained in adult life. Even in the case of adults the more heroic methods of operation in many cases are not called for.
8. The prognosis in paralytic cases will vary according to the nature and degree of paralysis.

The Removal of the Gasserian Ganglion.—COELHO (*Rev. de Chir.*, 1899, No. 5) reviews the literature of this subject, and comes to the following conclusion based upon the work of others and his own results reported in the cases in which he has been successful:

1. The ablation of the Gasserian ganglion should be the last resort in the treatment of trigeminal neuralgias, as it is a dangerous intervention on account of the liability to injury of the internal carotid. The injury of the cavernous sinus and of the middle meningeal, although not so dangerous, since their injury can be recovered from, weakens the individual and retards the operation. Cerebral compression, shock, and secondary infection are the causes that produce death.

2. The extirpation of the ganglion should be executed by tearing away the trigeminal at the protuberance, if recurrence is to be avoided, for thus only can we be certain that the entire ganglion has been removed; this cannot be assured in isolated removal of the ganglion.

Psychical Disturbances after Operation.—MARANDON DE MONTYEL (*Rev. de Chir.*, 1899, No. 5) divides this subject into two groups, composed of those cases in which the psychic phenomena are acute and transient and in the other they are permanent—that is, there are toxic delirium and permanent lunacy.

The former or acute may follow any operation as may deliriums that follow poisonings from any drug or septic conditions. Previous intoxication has no effect, nor do habit or occupation or the results of previous disease produce a predisposition. On the other hand, manias require for their production a predisposition.

The varieties of post-operatory psychic disturbance are very numerous. The delirium, however, has its characteristics for each particular form of poisoning, while the manias vary in degree in proportion to the predisposition.

Operations upon the thyroid have an especial influence upon the intelligence. All others have relatively an identical influence from the post-operative stand-point. Gynecological operations, and especially those upon the ovary, are wrongly judged to have peculiar psychic effects.

With our present knowledge it is possible to explain the post-operative delirium, as it is toxic in its origin, but it is impossible to explain the mania which occurs at this time.

A Case of Renal Sarcoma Successfully Removed by Lumbar Nephrectomy.—JONES (*The Edinburgh Medical Journal*, June, 1899) reports the following case, which, in the light of recent research on this subject, is very interesting.

It has recently been shown that these malignant growths differ in their structure and by the clinical histories; that in a considerable number of cases nephrectomy has been successful not only as regards the operation, but also that it has prevented the recurrence and spread of the disease. These growths certainly differ in their "malignancy," and there can be no doubt that our knowledge will be more definite and precise if we look for guidance in our treatment to a careful study of clinical histories and the microscopical structure of the growths removed.

The case presented the following symptoms: A previous attack, eight years ago, of "inflammation of the kidneys," which lasted two weeks. No family history of malignant disease. Eight months ago the patient twisted

himself while carrying a plank. This led to hæmaturia, blood continuing to be present in the urine several days. For the past three months there had been considerable lumbar pain, at first dull aching, unassociated with sickness, and not continuous. Later it became more severe and practically permanent, and blood made its appearance in the urine in the form of long, thin clots of blood, looking as if they had been moulded in the ureter.

The patient was robust and healthy-looking. Urine neutral, 1012, and contained blood and albumin. Examination under an anæsthetic revealed an enlargement of the left kidney, with a distinct nodular mass in the lower part. The lumbar operation showed the kidney to be the seat of a distinct growth, which was localized. Nephrectomy was performed, and the patient recovered completely.

The microscopical examination showed the tumor to consist of embryonic connective tissue cells, separated and surrounded by newly-formed fibrous tissue-like elements. The cells varied somewhat in size and form. Many were round or slightly oval, and stained deeply with hæmatin. Others were elongated and distinctly spindle-shaped. In some parts the cells were aggregated in dense masses, while in other areas they were separated by strands of fine, embryonic connective tissue, which formed a delicate stroma in which the cells appeared in somewhat alveolated form. In extensive areas the supporting tissue had undergone myxomatous change, and in some parts the cells seemed to be participating. These areas presented a curious honeycomb-like appearance, with the cells lying in many instances quite free in the spaces. The greater part of the growth stained readily. The vessels appeared as mere spaces lying in the tumor, with no distinct walls. The tumor was in parts very vascular, as was the tissue surrounding it.

The Surgical Treatment of Tuberculosis of the Lung.—Turban-Davos (*Berlin. klin. Woch.*, 1899, No. 21) compares the treatment of tuberculosis of the lung to the treatment of tubercular foci in any position. The result of serous effusions and empyemata has demonstrated the tendency of the abscess cavity in the lung to undergo the same spontaneous healing that occurs in other tubercular abscesses when the collapse of their walls is permitted by the surrounding structures. This has been previously attempted by thoracotomy, but the impossibility of preventing a subsequent infection of the pleural cavity has militated against its employment. The author proposes as a substitution a thoroplasty, which permits the thoracic wall to yield and the lung within it to collapse and close the cavity within. He resects a portion of each rib in the midaxillary line, taking care that the pleura is not injured and that the periosteum is removed so that no new bone can be formed.

This operation he would especially recommend in cases where the thoracic wall is rigid and the lung has been the seat of marked tubercular disease. He has seen it afford marked relief.

The Development and Nature of Tumors of the Salivary Glands.—Hinsberg (*Deut. Zeit. f. Chir.*, 1899, Band li. Hefte 3 u. 4) summarizes the results of a careful clinical, microscopical, and pathological study of the various tumors that occur in these glands, as follows:

1. The encapsulated tumors of the salivary gland, and probably those which involve them from other portions of the cranium, consist of epithelial elements and a stroma that is of the nature of bone cartilage.

2. They are benign when they present an organic arrangement, as, for instance, the epithelium and connective tissue of a gland. They are malignant when this order is altered, and we find the epithelium, either from trauma or by operation, in a wrong relation to the surrounding tissues, as in the connective tissue of the parotid gland. It develops, then, without the early characteristic stroma. The latter is also wanting when the tumor is malignant; this the author has confirmed in a series of cases.

3. Both components of the tumor—the epithelium and the stroma—develop from embryonal tissue in the Cohnheim sense. In the embryo the condition for a common development are present, as the parotid as well as the submaxillary gland, before they are encapsulated lie with individual acini close and firm in the periosteum of the inferior maxilla—*i. e.*, in the perichondrium of the Reichert's cartilage. The cylindrical epithelium comes undoubtedly from the gland itself, perhaps also the pavement epithelium, perhaps from the elongated layer of cells.

4. The undoubted evidence which confirms the author in the opinion that the tumors develop from the endothelium of the lymph-spaces and ducts are the following:

He does not believe, with Volkmann, that these tumors commence in the endothelium or that the origin of the tumor can be found microscopically in the tumor itself.

He believes that the tissues present in various stroma, especially the cartilaginous, osseous, and hyaline, are not the result of a metaplasia, but that they result from special conditions.

5. He holds that the theory that they are the result of a combination of epithelium with osteochondromatous tissues from outside is justified by the facts that the nature of the epithelial cells has been shown to justify such a belief. The arrangement is epithelial in its exquisite delicacy, and the arrangement of the cells complex. The fact that sometimes there is no direct connection with the epithelium of the gland is not against this theory. Such connection is not to be expected since it is developed from embryonal tissue. The presence of osseous and cartilaginous cells admits of no other explanation, while the conditions for such development are present in the embryo.

Successful Extirpation of a Cancer of the Œsophagus.—It is seldom that primary cancer of the œsophagus involves a portion of that tract that is amenable to treatment by surgical intervention. QUERVAIN (*Correspondenzblatt f. schw. Aerzte*, April 1, 1899) reports a case in which the œsophagus was involved for a considerable distance, but where uninvolved tissue was found above the arch of the aorta. The author was able to enucleate the tumor completely and to resect the œsophagus through healthy tissue at the level of the arch of the aorta. It was, however, impossible to insert sutures or to tie ligatures. The end of the œsophagus was allowed to slip down into the mediastinum and the wound was packed with gauze The wound above was closed so far as was possible, and both healed rapidly. A salivary fistula,

however, persisted unhealed from the mouth out upon the side of the neck, but the discharge was readily absorbed by three pads a day. The patient recovered completely, and continued to be well nourished by the gastric fistula, which had been established before the other operation was undertaken.

This operation is indicated where the stricture is high up, at 15 to 18 cm. from the incisors. This case also points to the fact that where an early diagnosis is made in such a case the operation is able to afford great relief and possible cure.

Inoperable Angiosarcoma Cured by Electrolysis.—VIDEBECH (*Cent. f. Chir.*, 1898, No. 31) reports a case of angiosarcoma occurring in a girl of sixteen years. It was the size of a child's head; was situated at the base of the neck posteriorly, and had rapidly increased in size during the last two months.

The attempt was made to remove it, as it was not adherent to the skin and had considerable freedom of motion. The operation, however, showed that it had invaded the deeper structures and had passed anteriorly between the lateral spines of the vertebræ, where it was impossible to reach. After as much as was possible had been removed, the wound was cauterized with chloride of zinc and an aseptic dressing applied. The microscopical examination of the tumor showed it to be an angiosarcoma. On the removal of the dressing on the fifth day there was considerable hemorrhage. The wound was packed with iodoform gauze, and the next day electrolysis was commenced. Four needles were passed from the positive and negative poles as deeply into the remaining tumor as was deemed safe, in different directions, and a current of 500 milliampères was passed. This was followed by a copious discharge of necrotic tissue sometimes as large as an egg. The wound finally cleared up and granulated over.

About a month later the granulations assumed an unhealthy appearance and a microscopical examination showed sarcomatous cells. The electrolysis was, therefore, repeated on four successive days. The current was several hundred milliampères, and the chemical action about the nedles was marked. The wound healed rapidly after this by granulation, and the patient was shortly dismissed, about six weeks after the original operation.

The patient was under observation for over three years, and no recurrence had been noted.

A careful review of the literature of the subject shows that no results similar to this have been obtained where the nature of the tumor has been determined by microscopical examination, and an operation has demonstrated the impossibility of removing it in its entirety.

The author agrees with Kaarsberg, that the rational method of operating by electrolysis consists (1) in using it as an adjunct to the knife where that cannot be employed; (2) in the employment of strong currents of electricity, which produce a decided, quick, and thorough destruction of the diseased tissues. To make this possible the tissues must be freely accessible, so that one can see where to work and avoid injuring vital parts, and also to provide an outlet for the devitalized tissues.

Powerful currents are not as dangerous as has been supposed. The needles

should be thrust deeply in at various points, and should be employed on both poles.

The Employment of the Soluble Silver Salts of Metallic Silver in the Treatment of Septic Wound Infection.—WELTER (*Deutsch. med. Woch.*, 1898, No. 40) reports an interesting series of cases of general infection in which he has secured remarkable results by the employment of Credé's ointment. He summarizes his views as follows:

1. In soluble metallic silver we have a useful agent, which, when a correct early diagnosis is made, before severe secondary infection has taken place, is capable of influencing favorably blood-poisoning due to the absorption of septic infection.

2. Both acute and chronic sepsis and furunculosis are amenable to the general silver treatment.

3. The greatest energy is developed by the employment of inunctions of the unguentum Credé. Through this means a general systemic effect is produced by the rapid absorption into the blood of this agent, and thus a general antisepsis and disinfection of the entire organism is produced.

The Resection of the Cervical Sympathetic in the Treatment of Epilepsy, Etc.—JONNESCO (*Centralbl. für. Chir.*, February 11, 1899, No. 6) has performed this operation in forty-five cases. In forty-two cases the total bilateral resection was the method employed; in one cases total resection on one side and the extirpation of both superior cervical ganglia on the other side; in seven cases unilateral total extirpation and in one the bilateral removal of both superior cervical ganglia. Six cases died from epileptic seizures or some intercurrent disease. Of the thirty-nine remaining cases nineteen have remained under observation for a considerable length of time. Ten are cured; they have had no seizures for two years; five cases, for nineteen months; one case, from fifteen to eighteen months; three cases, for six months. Six other cases are markedly improved; two were not helped. The percentages are 55 per cent. cured; 28 per cent. improved; 15 per cent. without benefit.

One of his cases that also had chorea has had no attack for the past two years. The author believes that the operation should not be undertaken in all epileptics where mania and epileptic dementia are present, as the operation cannot promise certain results, since marked changes have taken place in the cortex of the brain. In cases of early epilepsy, with or without mania, the operation can produce brilliant results, as well from the crises as from the deeper changes in the cortical area, which considerably improves.

A closer study and knowledge of the causes of the epilepsy will make clearer the kind of cases which will derive most benefit from this operation. In reflex gastro-intestinal epilepsy it acts by the removal of the sympathetic fibres preventing the reflex stimulation. In the anæmic or toxic forms the resection of the sympathetics modifies the nerve-cell nutrition by altering the blood-supply or preventing the ingress of toxic products.

THERAPEUTICS.

UNDER THE CHARGE OF

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Suprarenal Gland Extract as a Hæmostatic.—M. LERMITH writes that a watery extract of suprarenal gland applied just before cocaine in ophthalmic practice greatly adds to the anæsthesia produced by the latter. Marked vasoconstriction of cutaneous and even subcutaneous vessels rapidly follows its exhibition. Conjunctival hyperæmia from any cause may be thus relieved. Eczema of the skin, nævi, and even sarcomata are also affected favorably. The extract is serviceable in nasal surgery, adding to the cocaine anæsthesia and preventing primary and secondary hemorrhage. The writer treated a patient suffering with recurrent epistaxis as follows: A solution of cocaine hydrochlorate, 5, distilled water, 95, was introduced into the nasal cavities on cotton, and withdrawn after five minutes. Then sponges saturated with a solution containing boric acid, 3; dried extract of suprarenal gland, 1, and distilled water, 96, were inserted and allowed to remain for the same length of time. These applications were first made on alternate days, and later twice a week. The immediate effect on the nasal mucous membrane was to produce ischæmia and entire cessation of the hemorrhages. For twenty months there has been no recurrence of what was previous to treatment a very frequent epistaxis. Following the application there was no oozing of blood, and the scar healed perfectly in six days. Treatment was continued for three months, and there were twenty-four applications in all.—*British Medical Journal*, 1899, No. 1991, p. 467.

Addison's Disease.—DR. A. SEIBERT reports two instances of the use of suprarenal extract. In the first there was a gain of about twenty pounds in weight, the pigmentation almost completely disappeared. The dose was five grains thrice daily; later, six times daily, or ten grains thrice daily. In the second articular rheumatism was severe, for which salicylic acid was administered by the rectum. Success followed the administration of five grains of the extract thrice daily.—*New Yorker Medicinische Monatschrift*, 1899, No. 3, S. 138.

To Prepare Solutions of Suprarenal Gland.—DR. M. D. LEDERMAN finds that formalin, carbolic acid, corrosive sublimate, and boric acid inhibit the marked vasoconstricting action of the gland. To prepare a serviceable solution ten grains of the gland are added to a drachm of a 25 per cent. solution of glycerin in water. This is placed in a wide-mouthed bottle and well shaken. After standing in a room at ordinary temperature for two days, with occasional shakings, it is filtered into a clean bottle. Thus made it will remain clear for some time, if kept cool. Glycerin seems to be sufficiently

antiseptic, and this solution is not too viscid for spraying. The method of use is by cotton application both before and immediately after the use of cocaine. No constitutional symptoms will be produced by cocaine under these condition.—*The Laryngoscope*, 1899, No. 4, p. 217.

[It should be noted that the previous application of suprarenal extract to an inflamed mucous membrane will render cocaine effective in producing anæsthesia when this would otherwise be difficult or impossible.—R. W. W.]

Antistreptococcic Serum.—Dr. William L. Robinson reports upon the use of this remedy in the treatment of puerperal septicæmia, septic cellulitis, post-operative sepsis, and erysipelas. In this report the amount injected was usually two and one-half drachms, repeated if necessary. The success obtained in sixteen patients is an argument for early and free use of this method.—*The Virginia Medical Semi-monthly*, 1899, No. 23, p. 687.

Treatment of Ozæna.—Dr. P. McBride presents his experience with cupric electrolysis, the histories of eight patients being briefly presented. The strength of the current varied from 3 to 10 milliampères, rarely exceeding the latter. Cocaine was used in most, if not all, and after cleansing the nostrils the copper needle attached to the positive pole was inserted into the inferior or middle turbinated body, sometimes into the tissues lining the middle meatus, while the platinum or steel needle was passed into the septum. Usually the patients complained of little pain, nor did they experience disagreeable after-effects. As a rule, each sitting lasted about ten minutes. Of the eight patients, four were practically cured for long periods, extending to eighteen months. In one there was marked improvement; in one apparent cure for some months, but the syringing had to be resumed, while in two there was only improvement for a few weeks. The term "cure" refers only to the fetor, for in most of the patients the atrophy remained as before.—*The Edinburgh Medical Journal*, 1899, No. 3, p. 217.

Credé's Silver Salts.—Dr. Schill presents an excellent summary of the extant literature. The disadvantages of actol [silver lactate] are that it forms masses, and for that reason is dusted upon surfaces with difficulty; that it is sensitive to the action of light, and that it irritates nasal and laryngeal mucous membranes. Itrol [silver citrate] may be employed as a powder upon wounds, granulations or mucous membrane, or as a 1 or 2 per cent. ointment of lard, vaseline, or lanolin, or as aqueous solution, 1 to 4000 or 5000, for the disinfection of hands, instruments or the skin, and for irrigation of cavities. As 1 to 5000 or 10,000 it may be employed as a gargle or for moist dressings. Its disadvantages are the staining of linen, slow deodorizing properties, the cloudiness produced in ordinary (not distilled) water from the formation of silver chloride, whereby a portion of the silver is rendered inert, slow disinfection in advanced disease, and darkening on exposure to light. Colloid or soluble silver was first made nearly two years ago. This may be employed, even hypodermatically, as a 1 per cent. aqueous solution, preserved in dark glass bottles. Made up as an ointment with lard and wax, with benzoated ether to improve the odor, when rubbed into the skin about two-thirds is absorbed. The third method of administration is as a pill containing one-

sixth of a grain, with sugar of milk and glycerin as excipient, of which two may be taken twice or thrice daily, followed by three to six ounces of boiled water or tea. The importance of these remedies in various infectious diseases is evident, and the success attending their use is well established by a long series of favorable reports. Quite recently Dieckerhoff reported the successful use of colloid silver ointment in the purpura hemorrhagica of horses (four cases). In three he gave intravenous injections (jugular vein) of an ounce and a half of a 1 per cent. solution of colloid silver. Another received five such injections within two hours.—*Therapeutische Monatshefte*, 1899, Heft. iii. S. 162.

[The decidedly unsatisfactroy therapeusis of purpura hemorrhagica in man suggests a trial of colloid silver hypodermatically.—R. W. W.]

Sodium Tetra-iodo-phenolphtaleinate.—Dr. John S. Perekhan reports upon the results which he obtained in more than one hundred instances of the use of this remedy, which is commercially known as nosophen. It is obtained by the action of iodine upon phenolphtalein and occurs as a light and impalpable, yellowish-gray, odorless, tasteless powder containing over 60 per cent. of iodine. It may be heated to sterilization without decomposition, is insoluble in water and acids, with difficulty in alcohol, and readily in alkalies. It is generally used as a dusting powder, but may be mixed with colloidin, or employed as an emulsion, or gauze may be impregnated with it. Its siccation and hæmostatic properties are marked. It should not be used too freely, else a firm crust may be formed, which interferes with drainage. Since it is not irritating, non-poisonous, and has no odor, it is superior to iodoform. It is sedative, diminishes suppuration, and promotes healthy granulations.—*Chicago Medical Recorder*, 1899, No. 3, p. 222.

Phenocoll Hydrochlorate.—Dott. Salvatore Satullo remarks that although much stress is laid upon the antipyretic and analgesic properties of this drug, he has found it valuable in the treatment of malaria and rheumatism. For the former he regards it as almost a specific, a true substitute for quinine, and particularly to be used in case of idiosyncrasy or gastric disturbances. In pregnancy when quinine is contraindicated, this is an important remedy. The dose is from twenty to thirty grains daily, preferably before the febrile attacks. In rheumatism its effects are noteworthy, whether the disease is acute or chronic, and it is always to be preferred to the salicylates when cardiac weakness exists or threatens. The daily amount is one drachm. —*Gazetta degli Ospedali e delle Cliniche*, 1899, No. 13, p. 132.

On Morphinism.—Dr. Rabinovitch believes that in a large majority of habitual morphine maniacs there is a hereditary degeneracy. They often come from highly neurotic or neuropathic families deficient in will-power and mental poise. The normal mental equilibrium is lacking to start with, and there is added a drug-habit—morphine, or some other. She believes this view to be sustained by the fact that frequently these patients are highly intelligent and educated. Every effort is made, with the enfeebled will-power they possess, to conquer their inclinations, but without effect. The writer believes the victim of morphine is in a condition more closely akin to insan-

ity than is generally thought. Localization of the cerebral lesion, if there be any lesion, is not possible. The writer suggests an exaggerated appetite, lessened will-power or solutions of continuity in association fibres which maintain the "psychic harmony." Though vague in her explanation, she believes there is a definite material cerebral defect. Patients with these underlying fundamental deficiencies of brain-power are capable of great improvement under supervision; but the hereditary influence being marked and the unknown anatomical lesion (?) pronounced, mental instability is too great to expect permanent recovery.—*New York Medical Journal*, 1899, vol. lxix., No. 9, p. 302.

Dionin.—Dr. J. Korte gives the clinical name of this substance as ethyl-morphine hydrochloride, and its formula $C_{19}H_{22}NO_3HCl + H_2O$. It occurs as colorless crystalline powder, of markedly bitter taste, and readily soluble in water and alcohol. Twelve patients suffering from pulmonary tuberculosis received this remedy in half-grain doses at bedtime. The pharyngeal irritation was relieved, and restful sleep followed without night-sweating or other unpleasant symptoms. In some instances one-sixth of a grain seemed sufficient. Other symptoms, as cough, chest pains, and muscular soreness, were also benefited. Six patients suffered from chronic bronchitis and pulmonary emphysema. In general, the asthmatic attacks were relieved, the dyspnœa improved, and the cough and pains were benefited. As an analgesic and hypnotic eight observations are recorded. The conditions were various—hypostatic pneumonia, polyarticular rheumatism, inoperable uterine carcinoma, gastric and hepatic carcinoma (two instances), chronic parametritis, panaritium, and chronic gastric ulcer. In these the analgesic properties seemed established, and insomnia, so far as it was caused by pain, was benefited. Its field of use includes the irritation-cough of early pulmonary tuberculosis, that of chronic bronchitis, emphysema, and so-called bronchial asthma. As an analgesic it is not so trustworthy as morphine. It may be administered dissolved in distilled water or syrup, and made into pills with proper excipient.—*Therapeutische Monatshefte*, 1899, Heft 1, S. 33.

Aneson as a Substitute for Cocaine.—Dr. Masbachen presents his reasons for prefering this substance in the infiltration anæsthesia of Schleich and the regional anæsthesia of Oberst. This is the watery solution of trichlorpseudobutyl alcohol, or acetone chloroform, which in the past has not been utilized because of its insolubility in water. This difficulty has been overcome, and 1 or 2 per cent. solutions equal in anæsthetic power about 2 per cent. solutions of cocaine. The preparation is kept in wide-mouthed vials, each holding about two drachms, into which the hypodermatic syringe may be readily introduced. The solution is permanent. The advantages are: 1. The original preparations are used without dilution to various strengths, and the remedy acts even in severely inflamed tissues. 2. In point of harmlessness it is superior to all hitherto known remedies for local anæsthesia. 3. The secondary pains of infiltration anæsthesia are not observed when this remedy has been employed. 4. It is equally useful when employed according to the method of either Schleich or Oberst.—*Münchener medicinische Wochenschrift*, 1899, No. 3, S. 81.

Cosaprin.—Dr. Anton Schudmak reports upon the use of this substance, which is a sulpho-derivative of acetanilid, as an antipyretic and antirheumatic in the diseases of children. Laboratory experiments show that it is without influence upon micro-organisms, nor does it injure the blood, for 10 per cent. solution does not destroy the amœboid movements of the white corpuscles nor change in any respect the red. Since it is very soluble in water it may be administered in sweetened water as a 2 or 3 per cent. solution, of which the dose is a small spoonful every hour; or it may be given as a powder in four to eight-grain doses thrice daily, its somewhat salty taste not being objectionable. In the sixty instances of its use no untoward symptoms supervened. If rapid action is desired it may be administered subcutaneously, which is impracticable with two of the most important antirheumatic remedies—salicylic acid and sodium salicylate. The remedy has no marked effect upon either respiration or circulation, nor does it produce exanthemata. As an antipyretic the lowering of temperature is not lasting, in that the previous high temperature is again reached in two or three hours.—*Klinisch-Therapeutische Wochenschrift*, 1899, No. 2, S. 39.

Morphinomania.—Prof. Debove states that at first there is a short period of exaltation; following this the reverse occurs, and the victim is in the depths of despair, suffering much. Another dose of morphine is desired, which produces only a negative pleasure—a cessation of the craving for relief. Accidents often occur. If a vein is entered when the hypodermatic needle is inserted, vertigo immediately follows, and a condition closely simulating drunkenness, and this fact is often turned to account by the users of the drug. Carelessness in cleansing the syringe results in septic injections, producing abscesses and erysipelas. As the patient's resistant power is weakened, death not infrequently results. Primary injections of morphine are very disagreeable, being often followed by nausea and vomiting. Then exaltation is paramount. This period may last weeks or months. Sooner or later no result is obtained from injections except cessation of desire for the drug. Effects of morphinism are discussed *seriatim*. The muscular system is weakened, both striated and non-striated muscles being involved. Thus the obstinate constipation and dysuria are caused. A fine tremor like that of alcohol-poisoning is often present. General sensation is affected, pruritus and neuralgias are of frequent occurrence. Vision, smell, and hearing are enfeebled. The pupils are regularly contracted, accompanied anorexia and dry tongue, great thirst. Absence of hydrochloric acid in the gastric juice, diminished secretion of the intestinal glands and of bile, together with clay-colored dejections, force the symptom-complex in the gastro-intestinal tract. Nutrition fails, loss of flesh follows, and œdema of moderate degree is seen about the ankles. The skin becomes rough, the sweat-glands increase their activity (that of the sebaceous glands is diminished), and various eruptions, abscesses, and furuncles are frequent. The urine is unaltered. Albuminuria and glycosuria are probably not caused by morphinism. If the drug is present in the urine it is in very small amounts. Sexual desire is destroyed and impotence follows. Temporary sexual excitement may follow an injection of morphine. Amenorrhœa is common. Children born of mothers with morphine habit show in their first days an unusual depression and collapse.

If opium in some form is not exhibited death may follow. Later the drug may be slowly withdrawn. Psychical changes are common. Patients become silent, morose; memory is impaired, volition is diminished. They are famous liars, and sense of right and honor are lost. Hallucinations occur, and even paranoia. When morphine is withheld there follows an increase in nasal and bronchial secretions; the voice is hoarse; there is mydriasis. Headache and neuralgia are severe. Emesis, hyperacidity, colic, and diarrhœa soon appear. A grave collapse may follow, in which hypodermatic injection is indicated. Cachexia is the last stage, with premature old age. Complications of morphinism are: Hysteria, most often present during primary abstinence. Insanity rarely occurs as a resulting condition unless there is some predisposition. Alcohol, opium, cocaine, chloral, and ether are often tried as substitutes for morphine, with the result that a second drug habit is grafted on the first. Prognosis in morphinism *quoad vitam* is unfavorable, because mental depression is so marked, leading to recklessness, and because of the great difficulty in effecting a cure. Prophylactic treatment consists in wise abstention from its use, except where absolutely necessary. Pharmacists should accept only recent prescriptions. Curative treatment consists in winning the confidence of the patient and slowly diminishing the dose taken. When the habit is very marked, asylum treatment is the only rational method. For these patients complete, sudden withdrawal of the drug is not advocated, because of the intense suffering entailed, but diminution by half each day is recommended. Relapse must be guarded against. Alcohol, antipyrin, opium may be of temporary service to lessen the cravings of the patient during the first days. Lavage is useful, but the author prefers alkalies or chalk carbonate to counteract the hyperacidity of gastric juice which is present.—*La Presse Medicale*, 1899, No. 9, p. 49.

Orexin in the Vomiting of Pregnancy.—Dr. F. Hermanni reports nine instances of the use of this remedy in five-grain doses after each meal. Not only was the vomiting speedily relieved, but the nausea ceased and the appetite returned. Frequently but a few days' treatment was necessary to effect a permanent cure. No unpleasant symptoms were occasioned by the remedy. —*Therapeutische Monatshefte*, 1899, Heft 1, S. 24.

Urotropin in Cystitis.—Dr. O. Heubner writes of the use of urotropin in pedriatic practice, reporting five cases. Of these four patients suffered from cystitis, voiding urine of ammoniacal reaction. In these improvement rapidly followed the establishment of an acid reaction. In the fifth, suffering from ulcerative urethritis and cystitis, with pyelonephritis and renal degeneration, the urine remained acid. The remedy had no effect upon the amount of pus voided in the urine. Continued use of the remedy does not produce any untoward result upon either the digestive or nervous systems. —*Die Therapie der Gegenwart*, 1899, 2te Heft, S. 63.

The Morphine Habit and Its Cure.—Dr. David Paulson describes a method of treating morphinism. The patient is at once told what is to be done for him. No deceit of any kind is practised. Distilled-water hypodermatic injections, with the statement that they are morphine solutions,

are not given. Patients are put to bed, each one having an attendant solely for himself. Warm electric baths—how prepared the author does not state—are given, with the usual result that irritation of the peripheral and central nerves is much lessened, and the patient falls asleep while still in the bath. This is continued for half an hour; the patient is then placed on a bed and gentle heat is applied to the spine. Next galvanism is practised, the positive pole to the spine. In cases in which the head is hot and flushed, ice-compresses are indicated. The purpose of this part of the treatment is to allay nerve irritation and distract the patient's mind. While the drug is being withdrawn the patient is kept on a fluid diet, largely of fruit-juices. Koumyss and buttermilk are freely given. The patient is encouraged to eat at three to four-hour intervals. Nausea and vomiting are combated by omitting the feedings, and rectal enemata are substituted. Beef-tea and flesh-foods are prohibited, as they are too great nerve stimulants(?) and increase the desire for the drug. When severe diarrhœa is expected or has occurred, bismuth and fluid extract of coto are given every two hours; the result is usually satisfactory.

The necessity for exhibiting morphine is wholly done away with, as a rule. Indications for giving morphine are: If suffering is great on the second day a small dose (amount not specified) is given. Rarely a second is needed. The crisis is passed under thirty hours. Other drugs are not to be substituted for morphine, as some equally pernicious habit may result. Tobacco must be stopped, since statistics show that when it is not used the percentage of relapses is much smaller. Insomnia is not to be treated by hypnotics, for another habit may follow; in their stead the patient receives a "neutral bath" at 93° F. before retiring. A moist, cold, abdominal bandage is applied. Relaxation of abdominal vessels and lessened cerebral congestion follows. Later graded gymnastics and outdoor exercise are carried out. Very few relapses have occurred.—*Modern Medicine and Bacteriological Review*, 1898, vol. vii. p. 254.

On Chloralamid.—Dr. W. Kramm writes that chloratum foramidatum or chloralamid is most closely related to chloral hydrate in its constitution and action. Chloralamid decomposes in aqueous solutions above 140° F. and in alkaline media, but it may be given in slightly acidulated liquids. In powder or in milk the drug dissolves so slowly that sleep does not result until the following day. Settow has had much success with enemata made as follows: Chloralamid, 45 grains; diluted hydrochloric acid, 7 minims; alcohol, 18 minims; distilled water, 3½ ounces. Dosage of chloralamid varies between 15 and 60 grains. The maximum for twenty-four hours is 120 grains. Sleep follows its exhibition more slowly than in the case of chloral, thirty minutes to an hour being the rule. Duration of sleep is on an average six hours for the full effect. Indication for its use is a large variety of acute and chronic conditions where a mild, certain, and safe hypnotic is required. Chloralamid changes the blood-pressure very little, it is free from bad effect on the heart, and in many cases of cardiac diseases it can be safely used. As a sedative and hypnotic it is valuable in insanity; objections to its use are that as after-effects there is sometimes headache lasting one-half to one hour, and rarely stupor may supervene. The writer concludes by

saying that all authors state chloralamid is well borne by the stomach and does not impair appetite or digestion.—*Notes on New Remedies*, 1898, vol. x. p. 22.

The Etiology and Treatment of Laryngeal Tuberculosis.—Dr. P. S. Donellan recommends the following for control of cough in the above condition: Codein sulphate, 3 grains; sodium bromide, 120 grains; syrup of wild cherry, 4 drachms; water to 2 ounces. Of this the dose is one drachm every four hours. Dysphagia is relieved by cocaine applications (4 per cent. solution), either as spray or with a laryngeal brush. Wolfenden's method of feeding is recommended: The Trendelenburg position while sucking liquid food through a tube. Rectal feeding may be temporarily indicated to give rest to the larynx. Krause's method of local treatment for ulceration is thus outlined: Cleanse the larynx with Dobell's solution; follow this with a 4 per cent. cocaine spray, and then thoroughly rub the surface of the ulcer with a solution of lactic acid. This is to be done every three or four days. Solutions will vary, according to circumstances, from 20 to 80 per cent. A cotton applicator is to be used. Often the ulcers heal completely. Curetting of the ulcerous surface before applying the acid is sometimes practised (Herying); but there is danger of producing still further secondary infection through the increased raw surface. Minim doses of pure guaiacol have been injected beneath the mucous membrane into the tubercular areas preceding ulceration, a special syringe being used (Donellan). The advisability of performing tracheotomy must be decided for each case on its own merits.—*The Therapeutic Gazette*, 1898, vol. xxii. p. 724.

The Treatment of Consumption and Lupus by Tuberculin.—Dr. G. A. Heron began to use the new tuberculin (tr.) in March of last year. Ten patients were under observation; but one of these suffered from lupus. He has never seen harm done by the use of this remedy. It has done good in the treatment of lupus, and it is of value in helping consumptives on the way to recovery, provided the disease is in a very early stage. In advanced stages of the disease the discomfort inseparable from the use of the hypodermatic syringe is sufficiently outweighed by the slight chance there is of possible good that might come from the use of tuberculin. Of cure it is impossible as yet to speak, for there may be relapse in any one of the patients who now present a promising outlook. At present the new tuberculin is of more use than any other drug in the curative treatment of very early stages of tuberculosis affecting the lungs or skin.—*British Medical Journal*, 1898, No. 1958, p. 77.

The Antipneumonic Serum of Paul.—Dott. R. Marsalongo and C. Franchini present the history of the production of this serum and the results of its administration in ten instances. Three deaths were recorded, all being alcoholic subjects, showing evidences of chronic nephritis. Its use seems to be free from general or local disturbance. It is antipyretic, solely because it arrests or modifies the disease, acting directly upon the local infection, and favors resolution. Its use is recommended in the severest cases—those complicated by degenerated arteries, chronic nephritis, chronic cardiac

diseases, alcoholics, old age—giving better results than any other method.—*La Riforma Medica*, 1898, No. 31, p. 364.

OBSTETRICS.

UNDER THE CHARGE OF

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The Choice of Incision and Suture in Cæsarean Section.—In the *Archiv für Gynäkologie*, 1899, Band lvi. Heft 3, SIPPEL reports two interesting cases of Cæsarean operation, and discusses the best method of making the incision and the best suture material.

He draws attention to the fact that silk sutures act as drainage-tubes by capillary attraction, and that a silk suture passed through the wall of the womb into the uterine cavity may furnish a means of communication between the interior of the uterus and the peritoneal cavity. In healthy patients the womb is sterile and aseptic at labor; but should this not be the case infection might pass from the uterus to the peritoneal cavity by means of stitches. As an illustration of this he describes an interesting case, as follows:

The patient was a healthy woman in her fifth pregnancy, whose labor was made impossible by a solid ovarian tumor. Cæsarean section, followed by the removal of the tumor, was very readily performed. Foul lochial discharge was present on the third and fourth days, and above the symphysis there was a painful area. Here an exudate developed between the uterus and the wall of the abdomen. During a fit of coughing this exudate burst into the abdomen, and forty-eight hours later the patient died of peritonitis.

Upon autopsy it was found that on one side of the womb, where the silk stitches had proceeded from within outward, septic material had passed along the stitches to the peritoneum. The interior of the womb was septic, but not to a serious extent. Under ordinary circumstances the patient should have recovered readily from the condition present.

It is easy to understand how a mild degree of sepsis may readily arise during prolonged labor. The membranes may protrude and come in contact with the external genitalia, which may not be thoroughly clean. The head of the child may advance and recede, and also furnish a channel for contagion. Repeated examinations would increase the danger.

For this reason Sippel operated upon his second case by an incision upon the posterior wall of the uterus. He closed the uterine wall with catgut at the decidua and buried silk in the muscular tissue, and closed the peritoneal covering of the womb. His patient made a good recovery.

Sippel also draws attention to the difficulty experienced in closing the uterine wall when the placenta is directly under the line of incision. The placental site in the uterus is not tissue favorable for suture, and good union is difficult to obtain. He would, if possible, locate the situation of the placenta before opening the uterus, and so plan his incision as to avoid the placental site. He draws attention to the analogy between suture of the womb and suture of the intestine, and believes that in the case of the uterus catgut is better, because of its freedom from capillarity. He does not favor the transverse incision of Fritsch, but distinctly adheres to the longitudinal incision.

[We have, on one occasion, had suppuration occur in the wall of the uterus after Cæsarean operation. We were obliged to close the womb through the placental site. The peritoneum was stitched over the silk sutures with catgut, and the womb became adherent to the anterior peritoneal lining of the abdomen. Some days after stitch-hole abscess occurred in the abdominal wall, which communicated with the anterior surface of the womb. Through this abscess some of the buried silk sutures from the uterine wall were discharged. Bacteriological examination of the pus showed the white bacillus of the skin to be the germ present. It was found that the patient had passed her finger beneath the dressing and infected the wound, because she wished to remain in the hospital. She subsequently made a good recovery, the uterus being small, partly movable, and adherent to the anterior abdominal wall when she was discharged. It is undoubtedly better not to pass the stitches through the decidua in closing the wound. As the womb becomes adherent to the abdominal wall in these cases, stitch-hole abscess must not be neglected as a cause for suppuration in the uterine stitches.]

Credé's Silver Ointment in Puerperal Sepsis.—In *Obstetrics*, 1899, No. 2, JONES contributes a paper upon this subject.

Statistics show that between 100 and 200 deaths occur yearly from puerperal sepsis in New York. In addition to other methods of treatment, he calls attention to the use of Créde's silver ointment by inunction.

The preparation of silver which is employed is not a salt of silver, but is soluble, uncombined metallic silver made into an ointment 15 per cent. strong. Three grammes of the ointment contain about four and one-half grains of pure silver. This ointment has been used once in twenty-four to thirty-six hours in acute and in chronic cases twice daily. It is rubbed into the body at some distance from the point of infection, and should be thoroughly carried into the skin and subjacent tissues. The results of the treatment are immediate improvement in the symptoms, beginning within from three to ten hours.

Jones's case was as follows: The patient was a delicate woman, aged twenty-one years, primipara, delivered after tedious labor, necessitating dilatation of the cervix and the use of forceps. The placenta was firmly attached and had to be removed. There was no hemorrhage and but little laceration. Antiseptic precautions were employed, and the uterus was douched with hot lysol solution and the vagina with bichloride solution. The lochia did not become foul, but on the third and fourth days there were

fever, chills, and sweat. The patient was anæsthetized, the uterus scraped with the finger, thoroughly douched, and packed with iodoform gauze. Septic nephritis was present. The patient gradually developed general septic absorption. On the eleventh day her condition was critical.

Between one and two drachms of Créde's silver ointment was rubbed into the inner surface of the thigh, and repeated on the following morning. A rapid and marked improvement followed, the patient's temperature falling to normal and her pulse gradually improving. Five days afterward there was again fever and rapid pulse, when two inunctions were given twelve hours apart. After this inunctions were given daily in small quantity for four days, and then at intervals.

No evidence of toxic action by the ointment could be obtained by examining the urine or in any other way. Altogether about one and one-quarter ounces of the ointment were employed. The patient made a good recovery by the twenty-seventh day.

Management of the Placenta in Abdominal Pregnancy.—AYRES, of New York (*Obstetrics*, 1899, No. 2), contributes a paper upon this subject, in which he gives the results of clinical observation and also of experiments.

He would choose a vaginal operation when the fœtus has already perforated the vagina or when it is suppurating or pressing with the head closely against the vaginal wall. If bleeding is slight the placenta should be removed and the cavity drained. If the fœtus is living abdominal section is indicated, and the fœtus should be first removed without the placenta. If the placental circulation is active the operator must control hemorhrage by ligating the ovarian and uterine arteries before he separates the placenta. In the effort to control hemorrhage during the removal of the placenta the aorta may be compressed and the bleeding surfaces subjected to pressure by hot gauze. If the ovum is extraperitoneal it should if possible be enucleated, and the uterus should also be removed if necessary.

If the placenta cannot be removed the sac may be stitched to the abdominal wound, packed with gauze, and the cord cut off close to the placenta. When the placenta is within the peritoneal cavity it may be injected through the vessels with a solution of tannin and salicylic acid or with formaldehyde, the cord cut short, the sac trimmed off, and the wound closed. It may become necessary, should disturbance occur, to remove the placenta by a secondary operation.

When the fœtus is recently dead an immediate or a delayed operation becomes elective. If the child has been dead a month or longer it should be at once removed, and the placenta, when macerated or putrid, must also be taken away.

The Treatment of the Incarcerated Pregnant Uterus by an Elastic Bag.—In the *Centralblatt für Gynäkologie*, 1899, No. 5, WESTPHALEN reports an interesting case of retroversion of the pregnant uterus which became incarcerated and which was restored to normal position by the use of an elastic bag.

The patient had borne six children. She was in the third month of pregnancy, and for three weeks had suffered from disturbance in the functions of

the bladder and pain. Both legs had swelled and had been swollen for eight days. Obstinate constipation was present. The womb was retroflexed beneath the promontory of the sacrum. Efforts to replace it by manipulation failed. A further attempt was made with the patient under an anæsthetic and also in the knee-chest posture. The womb could be brought up to the promontory of the sacrum, but could not be replaced. Accordingly, a large elastic bag was inserted within the vagina and distended, and the patient was placed upon her side with the pelvis considerably raised. When the patient was next seen it was found that the swelling in the limbs had subsided, the symptoms had disappeared, and the womb had become replaced. Further treatment consisted in keeping her in bed, lying upon the side for a short time only.

Perforation and Cranioclasis with the Three-bladed Cranioclast.—In the *Monatschrift für Geburtshülfe und Gynäkologie*, 1899, Band ix., Heft 1, WALTHARD contributes a paper upon this subect. He finds that in Switzerland, in the period from 1892 to 1896, inclusive, in 441,539 births, there were 15,975 births of dead children, and that of these 248 were craniotomies. Of this number, 80 were performed in hospitals, and 168 in private houses. It is evident from these statistics that the general practitioner must often perform craniotomy and that he should be possessed of the safest and most efficient instruments for this operation.

He also draws attention to the injuries which the mother often receives when craniotomy is performed, from bruising of the tissues of the birth-canal. He describes a very interesting case in which the anterior lip of the cervix became very much bruised and torn, and in which it was amputated at the time of labor. When the tissue which was removed was examined it was found to contain abundant streptococci.

Much weight is laid upon the importance of crushing the head in each instance before it is extracted. Hence those instruments which collapse the head by drawing it against the pelvic walls are inferior to those which crush it before extraction. Instruments employed for this operation must be of such a character that they can readily be applied to the fœtal head, and that during the extraction they will not crush or splinter the bones.

Walthard has obtained his best results by the use of a three-bladed cranioclast, and reports eleven cases in which the instrument was successfully employed. The centre branch contains a boring extremity which is carried deeply into the centre of the fœtal head as far as the base. The other blades are then applied to the sides, and the skull thoroughly crushed and removed. The form of instrument employed was that originally devised by Auvard, modified by Zweifel and also by Walthard.

[The basiotribe by Tarnier should not be forgotten in the consideration of this subject. This instrument probably suggested to Auvard and to others the modifications which they have employed. Although these instruments are all useful, still an experienced operator will seldom fail in the use of Braun's cranioclast and any simple crusher like Lusk's cephalotribe.]

A Malignant Blighted Ovum.—VOIGT (*Monatschrift für Geburtshülfe und Gynäkologie*, Band ix., Heft 1, 1899) contributes a very interesting paper

upon a subject which has occasioned much discussion, namely, malignant growth of the uterus following pregnancy and labor or abortion.

The patient was aged fifty-three years. She had had eight children, the youngest thirteen years old. In her early married life she had two miscarriages. In her fifty-third year there was disturbance of menstruation with flooding, and the application of a tampon was followed by the expulsion of a blighted ovum. After this she continued to bleed at intervals except when recumbent. A diagnosis was made of deciduoma malignum. A preliminary curetting was done and considerable decidua and remnants of the ovum were removed. This was followed by a chill and fever, and cultures were made from the lochial discharge and also from the blood taken from a vein in the arm. Streptococci were found in the lochial discharge, while the blood was sterile. Accordingly, the uterus was removed through the vagina. The patient made a good recovery, complicated by thrombosis of the smaller saphenous vein.

An examination was made of the specimens, and deciduoma malignum was not present. On the posterior wall of the uterus there was an area where the muscular tissue was much softened and injured, and where microscopic examination showed that the cells of the ovum had penetrated the muscular fibre of the uterus. The condition is best described as a malignant mole, proliferating through the muscular tissue, along the bloodvessels, which had almost perforated the uterus. Bacteriological examination of the tissue showed deposit of streptococci in great abundance.

After reviewing the writings of Marchand and others, Voigt comes to the conclusion that in this case cancer was not present. He considers it very significant that no metastases were found, and that following the removal of the uterus the patient promptly recovered. He thinks, however, that had not the uterus been so promptly removed, the growth would have taken on a malignant character, and that a deciduoma malignum would have resulted. In this instance the villi of the chorion had penetrated the venous channels in the wall of the uterus very freely. Fortunately, the process had not yet invaded the veins of the broad ligament, and hence the general blood stream remained free.

Voigt considers the origin of this to have been in the cells of the embryo. He also draws attention to the clinical history of the case and to the success which followed the very prompt removal of the uterus. He considers the syncytium as of maternal origin, and believes that such cases should invariably be treated by curetting.

Conservative Treatment of Chronic Inversion of the Uterus.—EVERKE (*Monatschrift für Geburtshülfe und Gynäkologie*, Band ix., Heft 1, 1899) reports the following interesting case: The patient was supposed to be suffering from a uterine polyp. On examination, it was found that the uterus had been inverted, this accident dating back thirteen years, when a midwife, in endeavoring to remove the placenta, had caused the inversion. Efforts at replacing the womb failing, the operator opened the abdomen and incised the uterus anteriorly and posteriorly at the point of constriction. The womb was then replaced by an assistant, who made pressure upon the fundus through the vagina, and the incisions were readily closed. An excellent

recovery followed, menstruation returned and was normal, and the patient's general health was excellent.

DISEASES OF THE LARYNX AND CONTIGUOUS STRUCTURES.

UNDER THE CHARGE OF

J. SOLIS-COHEN, M.D.,

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Abscess of the Pharynx.—Dr. James R. Arneill, of Ann Arbor, Mich., reports (*Medical News*, April 22, 1899) a case of pharyngeal abscess which had been diagnosed as tetanus. The difficulty in opening the mouth had followed a bungling extraction of a molar tooth four weeks previously. The successfull insertion of a gag revealed a swollen and inflamed pharynx, an incision into which evacuated a large quantity of pus, with great relief to the patient.

A Case of Scabbard-like Compression of the Trachea by Hypertrophied Thymus Gland.—M. Lange, who recently pulished a case in the *Jahrbuch f. Kinderheilkunde*, has reported an analogous one to the Medical Society of Leipsic at its meeting in December, 1898 (*Münch. Med. Woch.*, 1899, No. 3; *Journal Hebdomadaire de Laryngologie, d'Otologie, et de Rhinologie*, 1899, No. 8). The child was four months old, and had suffered for fourteen days with paroxysms of spasm of the glottis, which could not be modified by medical treatment. The patient died a few days later during one of these spasms. The one paroxysm witnessed by Dr. Lange differed essentially from spasm due to impeded respiration, there being thirty movements a minute, but these were regular and sonorous. There was cyanosis, flexion of the fingers, and clonic contraction of the extremities, the paroxysm lasting between three and four minutes, and obstinate bronchitis existing at the same time.

At the autopsy the enlarged thymus gland was discovered to be adherent to the pericardium. It was 8 cm. in length, 5 cm. in breadth, and 2 cm. in thickness. The heart was very much hypertrophied, especially in the left ventricle, which was at the same time very much dilated. This hypertrophy of the left ventricle was attributed to compression of the ascending aorta by the thymus. A cast was taken of the trachea, and showed considerable flattening of its inferior third.

Paralysis of the Larynx.—In a case of paralysis of the right vocal band in the phonatory position occurring in a case of carcinomatous stenosis of the œsophagus, Dr. John Sendziak, of Warsaw, detected (*Journal of Laryngology, Rhinology, and Otology*, March, 1899) the cause of the paralysis by using the Röntgen rays, confirming his opinion that it was due to compression of enlarged glands and not to the carcinoma itself. On transillumination both

in front and behind the glands were distinctly seen in the shape of irregular darkspots on the right side of the thoracic cavity at the level of the aorta, while the left side of the thorax did not present any changes.

MR. R. LAKE reports (*Ibid.*) a case of right recurrent paralysis with paresis of the trapezium, sternomastoid, and palate, with slight ptosis and facial paralysis, all on the same side. The patient, a man, aged thirty-six, had been stabbed over the right eye eleven years previously, and had subsequently had epilepsy, the last attack twelve months previous. There was no history of syphilis.

Laryngismus.—At a meeting of the Medical Society of the Hospitals, Paris, March 17, 1899 (*Medical News*, April 22, 1899), SEVESTRE spoke of the treatment of spasm of the larynx. This necessitates tracheotomy or prolonged intubation, and he attributes the affection to ulceration of tissues below the glottis.

Thyrotomy for Malignant Growths.—SIR FELIX SEMON recently presented to the Laryngological Society of London (*Journal of Laryngology, Rhinology, and Otology*, March, 1899) two cases of epithelioma and one of sarcoma of the larynx treated by thyrotomy, and keeping well two and a half years, one and a half years, and six months respectively after operation.

Tubular Epithelioma of the Nose.—DR. BRONNER, of Bradford, reports (*Journal of Laryngology, Rhinology, and Otology*, March, 1899) a case of removal of a growth the size of a large pea from the nasal mucous membrane just above the anterior part of the lower turbinated bone of a man forty-seven years of age. The growth had been removed about ten years ago, and there had been no recurrence.

MR. BUTLIN thought, from the appearance of the specimen, that it would be very difficult to decide whether it was an adenoma or carcinoma, and suggested that sections should be made for the purpose. The report of the Clinical Research Association had been that "the growth was maligant, of an epithelial type, and may be classed with the tubular epitheliomata. At the periphery beneath the mucous membrane tubules could be seen."

Extraordinary Case of Fibroma of the Nose.—DR. SENDZIAK, of Warsaw, reports (*Révue Hebd. de Laryngologie, d'Otologie et de Rhinologie*, 1899, No. 7) a case which occurred in a boy fourteen years of age, and had existed some five years without extension to adjacent structures, maxillary sinus or orbital cavity. Several successive abortive attempts at intranasal removal with the electric snare and with the cold wire had been attended with serious hemorrhages. Finally, a considerable mass was removed with the cold snare without hemorrhage, but a large quantity of serous fluid was discharged instead of the expected blood. This was followed by great relief and a considerable continuance of the serous discharge. On examination the position of the tumor seemed to be occupied by membrane, probably the sac of the cyst. It is supposed that the formation of the cyst in the sarcomatous tissue was the probable result of irritation from the repeated operations.

HYGIENE AND PUBLIC HEALTH.

UNDER THE CHARGE OF

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Botulism from Fish.—DR. R. DAVID (*Deutsche medicinische Wochenschrift*, 1899, No. 8) reports in detail five interesting cases of poisoning due to stale fish. The cases are remarkable for the variety of manifestations, the length of time that elapsed before the appearance of the symptoms, and, in two of them, the severity and duration of the illness. The afflicted persons, adult members of one family, ate on March 19, 1898, some raw red herrings, which gave off odor indicative of commencing putrefaction. Each ate the same amount, a whole fish; but whether each fish was equally advanced in decomposition cannot, of course, be determined, and the differing degrees of severity of effects may be explained by unequal susceptibility. The father and mother, aged, respectively, sixty-five and sixty-seven years, suffered least; the son, aged thirty-one years, was affected more seriously; the two daughters presented unusually severe and complicated symptoms.

The first effects were manifested by the son, who, on the second day, was seized with loss of appetite, disagreeable eructations, vomiting, diarrhœa, dryness of the throat, and general weakness. On the following day he was better, but soon became worse. Diarrhœa was followed by obstinate constipation, which finally yielded with difficulty to cathartics. Five days later he had dimness of sight, which was followed after a week by double vision and difficult deglutition. The symptoms gradually abated, and on May 27th there was distinct improvement of sight. On June 2d glasses were hardly needed.

The mother first showed symptoms on the fifth day, when nausea, constipation, and dryness of the throat appeared. Several days later she had double vision and difficult deglutition. The father's case began on the ninth day, and presented similar symptoms, which disappeared in six weeks. One of the daughters was seized on the third day with bad taste in the mouth, constipation, and dryness of the throat, followed in six days by dimness of near vision, then by double vision, paralysis of accommodation, and difficult swallowing. As was the case with the others, the temperature, circulation, and urine remained normal. On May 2d there was complete inability to swallow, and it was necessary to introduce food by means of a stomach-tube. There was slight ptosis of the right eye, then of both; the voice was nasal, the gait was affected, and the pulse became very small, though not very rapid. On May 9th bladder symptoms, which had been gradually appearing, culminated in paralysis of that organ, and after the 13th there came a variety of

bladder and abdominal symptoms. In the first part of July she felt completely well, but a month later (August) she suffered a slight relapse, with reappearance of constipation, difficult deglutition, and disturbance of vision, which persisted to some extent into September. Complete recovery did not occur until October, almost seven months after the disturbance began. The other daughter showed the first symptoms after the lapse of a week. These were in the main like those of her sister, but were more severe and extensive. She began to improve in May, and then ensued alternate improvement and loss of ground, better one day and worse the next. On the 15th there was pain in the left hypochondrium; on the 17th an eruption like that of scarlet fever over the whole body, with albuminuria, but no casts. On the 19th severe pain in the left hypochondrium, less in the right, and tenderness in the region of the kidneys, with epistaxis, disappearance of the rash, slight desquamation, and improved vision. At the end of May the albuminuria and pain in the region of the kidneys had nearly disappeared, and deglutition was perfect. On June 2d heart complications appeared, which persisted into November, when hypertrophy was established. In August, after a general improvement, there was a relapse like that which occurred in the case of her sister. Improvement was well established in October, and in November she had almost wholly recovered.

It was unfortunately impossible to make a bacteriological and chemical examination of the fish, because no material was obtainable.

[Had it been possible to make an investigation of the food material in this case it seems most probable, from the great similarity of the symptoms to those reported by Van Ermengen, due to eating infected raw ham (see this JOURNAL, July, 1898) that the same organism, *bacillus botulinus*, would have been found to be the cause of the trouble. The longer period of incubation in these cases is perhaps the most striking difference.—C. H.]

A New Method of Estimating Moisture in Walls.—DR. G. MARKL (*Archiv für Hygiene*, xxxiv. Heft 1) has devised a new scheme for determining moisture in mortar and plastered walls which seems likely to supersede entirely the methods heretofore in use, which, on one account and another, do not generally commend themselves, although they yield accurate results. His process is based on the fact that alcohol changes its specific gravity as it absorbs water. It is quickly carried out, requires no elaborate apparatus, and yields sufficiently accurate results. From 10 to 50 grammes of plaster are treated in a dry flask with 150 c.c. of strong alcohol of known specific gravity. The mixture is well shaken, filtered quickly through a dry filter, and then the rise in the specific gravity of the alcohol, due to the absorption of water, is determined. This is easily translated into percentage of water taken up. A series of comparison tests and analyses showed but a very slight difference in results, the differences being due to solution of minute amounts of the constituents of the material, as lime, common salt, nitrates of calcium and sodium, chloride of calcium, and others, but the amounts taken up in the alcohol are so slight as to be unworthy of notice.

The Germicidal Value of Proprietary Disinfectants.—DRS. HARRINGTON and R. M. PEARCE (*Journal of the Boston Society of Medical Sciences*, March,

1899) have made chemical analyses of a dozen of the popular proprietary disinfectants recommended for use in the sick-room, and have determined their germicidal value in the treatment of typhoid stools, tuberculous sputum, and diphtheria membrane. The materials treated were exposed uniformly to the action of the several disinfectants for two hours. Cultures were then made in fresh bouillon, and at the expiration of forty-eight hours the result, growth or no growth, was noted. In the case of sputum the process was different; the sputum which had been supposably disinfected was inoculated into the subcutaneous tissue of guinea-pigs, which, unless they died sooner, were killed at the end of six weeks. A control animal killed after five weeks showed typical tuberculous lesions.

The bacteriological tests showed that not one of the agents most commonly sold can be regarded as a safe and trustworthy disinfectant. Each one was given ten separate tests. Three of them proved to be absolutely inert, and the others gave from 30 to 90 per cent. of unsuccessful results. The results were far from uniform in repeated experiments with the same agent; thus, it might sterilize one typhoid stool and show no result with another. Only one of the entire twelve succeeded in sterilizing sputum, and that one is not sold as a general disinfectant, but as an "air purifier." Carbolic acid, 5 per cent.; formaldehyde, 1 per cent., and a 5 per cent. solution of a preparation containing cresols were also tried on the same objects. The carbolic acid was successful in only two out of six trials, one of the two being with sputum. The other two killed the organisms in every case.

Chemical analysis showed that the ingredients used are such as have a reputation as disinfectants, and that the preparations are not intentional frauds. The commonest ingredients were chloride and sulphate of aluminium, chlorides of zinc, magnesium, sodium, and potassium. Two contained copper, one lead, and one iron salts. One was wholly chloride of zinc, another was a plain solution of permanganate of potassium, another was a fairly strong preparation of chlorinated soda, and three were strong smelling preparations containing neutral tar oils.

The proprietary disinfectants are not only unreliable, but are expensive, enormously so in comparison with the simple and effective 1 per cent. solution of formaldehyde.

Life-duration of Pathogenic Bacteria.—PROFESSOR A. GAERTNER (*Zeitschrift für Hygiene und Infectionskrankheiten*, xxviii. Heft 1) has made an investigation of the influence of manure and compost on the life of pathogenic bacteria, with special reference to the disinfecting action of the rise in temperature, which under favorable conditions is considerable, the action of other bacteria present, chemical changes, lack of oxygen, and excess of carbon dioxide. In order to approximate natural conditions he made beds of horse-dung and cow-dung, with and without straw, garden soil, fecal and peaty matters, and buried in them, in wire baskets at varying depths, bacterial cultures, including cholera, typhoid, tuberculosis, chicken-cholera, and swine-erysipelas, mixed with human and animal feces. The beds began to heat very soon, and by the seventh day reached 70° C. in September, and 47.5° C. in October, and slowly cooled. In the beds made with human feces and earth the temperature never went above 30° C., and usually ran lower.

In winter there was no very marked rise, and in February it did not exceed 5.5° C. The organisms were destroyed the more quickly the higher the rise in temperature; but other factors, such as lack of oxygen, accumulation of carbon dioxide, etc., come into play. In summer they die more quickly than in winter; they may live months in cold weather. Typhoid and cholera were the least resistant of those tried; swine-erysipelas lasted twice as long, and chicken-cholera and tuberculosis were found to be virulent after months of exposure.

Dr. Martin Ficker (*Ibid.*, xxix. Heft 1) reports the results of a research on the influence of dryness, moisture, heat and cold, and other conditions on the life of the organisms of cholera, typhoid, diphtheria, and plague. The experiments were conducted with observance of the greatest care to secure agreement of conditions in all respects as to age and source of cultures, culture media, etc. Silk threads, dust, and other matters with varying physical and chemical properties were avoided, and the organisms were handled all in the same way on cover-glasses of one quality. They died more quickly when exposed in thin layers, and in thicker layers they retained their vitality longer in the desiccator than when exposed outside. Air in motion is more inimical to them than in a state of rest. The older the culture, other things being equal, the quicker it dies; the more virulent it is, the longer it resists. Alternation of dryness and moisture hastens the death of all four kinds in an extraordinary degree. In moist atmospheres life is retained longer with low temperatures, and old cultures live longer than new ones. In dry air the older cultures succumb earliest. In a moist atmosphere cultures of cholera one day old died in one to one and one-fifth days, while cultures five days old lasted from thirteen to sixteen days. The composition of the fluids in which the bacteria are has a material influence, and the thicker the sowing the longer the life-period. Old cultures show generally less resistance to heat than younger ones, but greater virulence is accompanied by greater resistance.

Leprosy in the United States.—In the report accompanying Senate bill 2904, providing for the investigation of leprosy in the United States (*Public Health Reports*, March 10, 1899) appears a letter from the Supervising Surgeon-General of the Marine-hospital Service suggesting the probability that there are many more cases of leprosy in the country than have been recorded. No systematic inquiry has been made with regard to the origin and prevalence of the disease. Recent investigation and study have demonstrated that quite a number of obscure forms of nervous and skin diseases are nothing more or less than leprosy.

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